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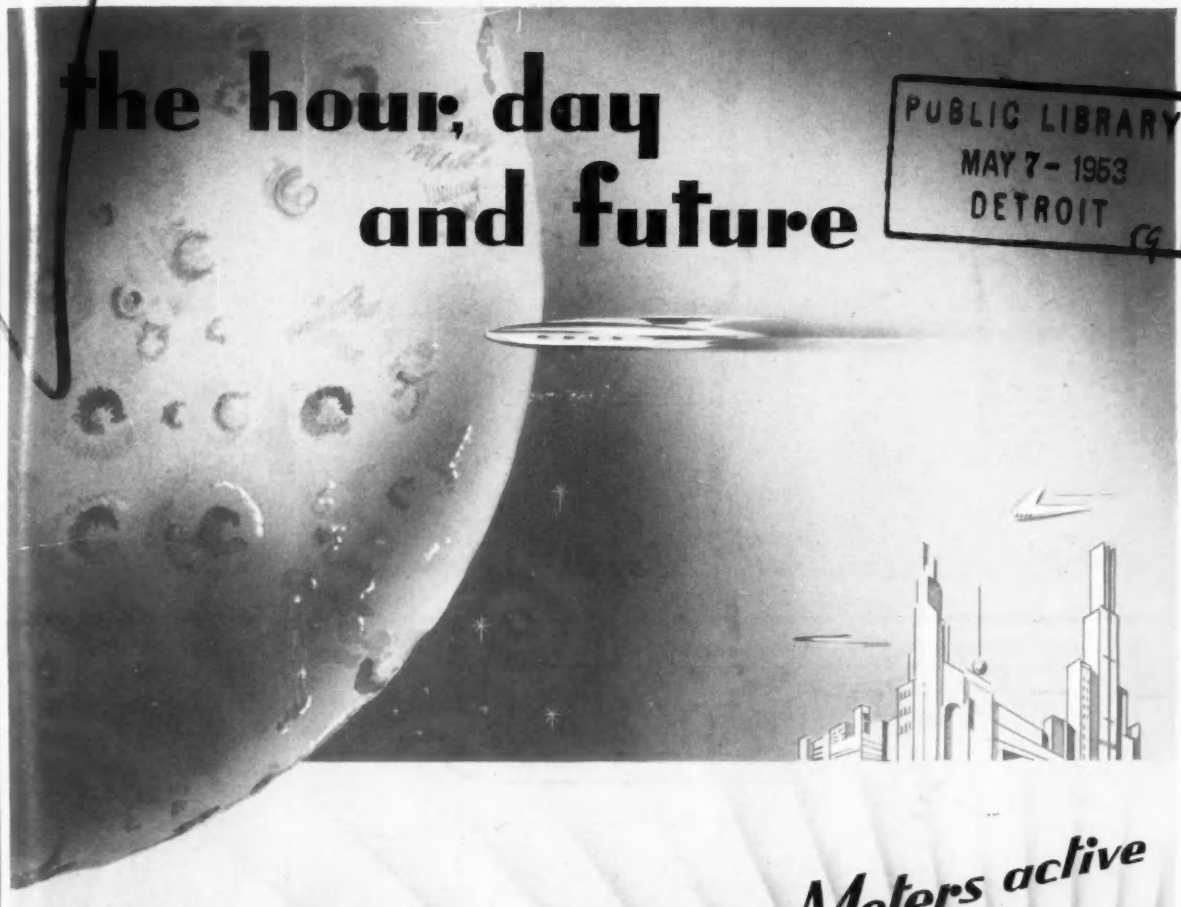

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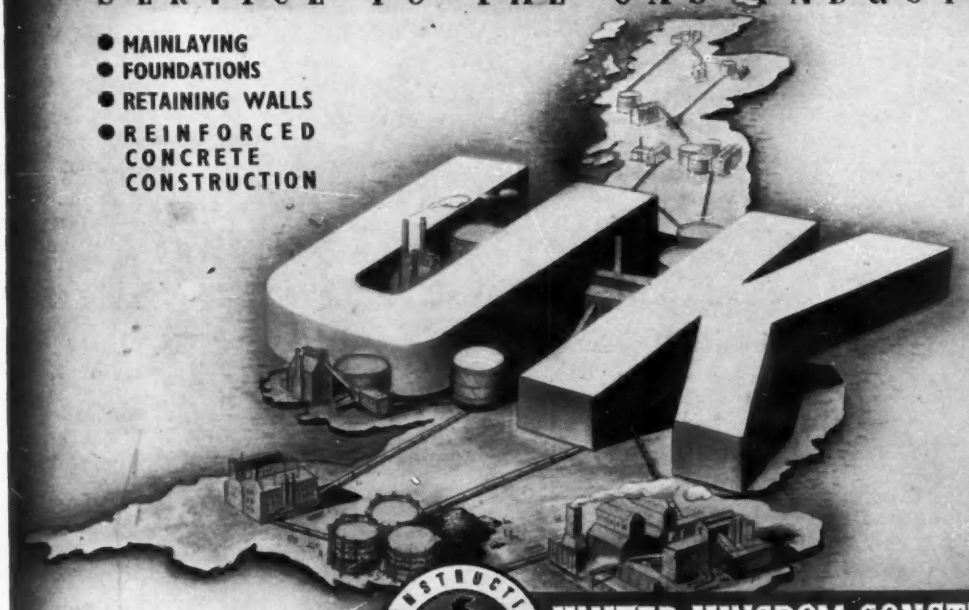

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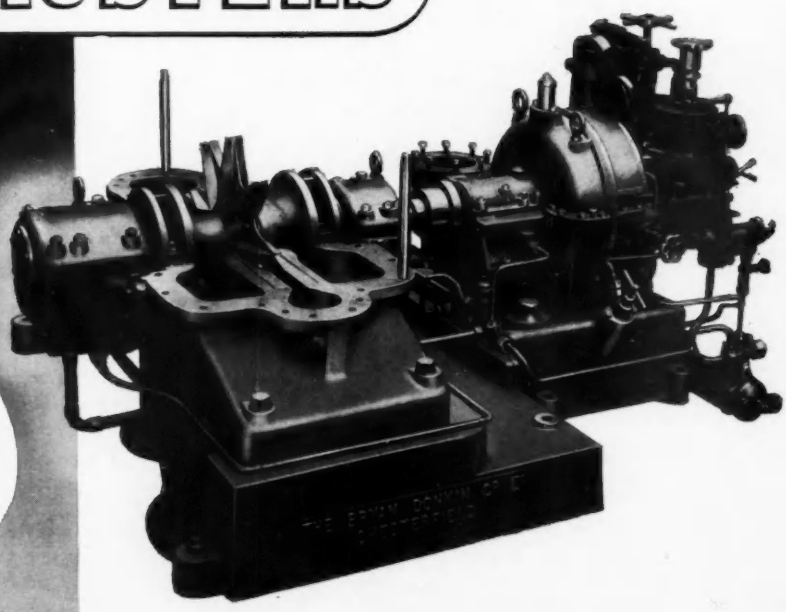

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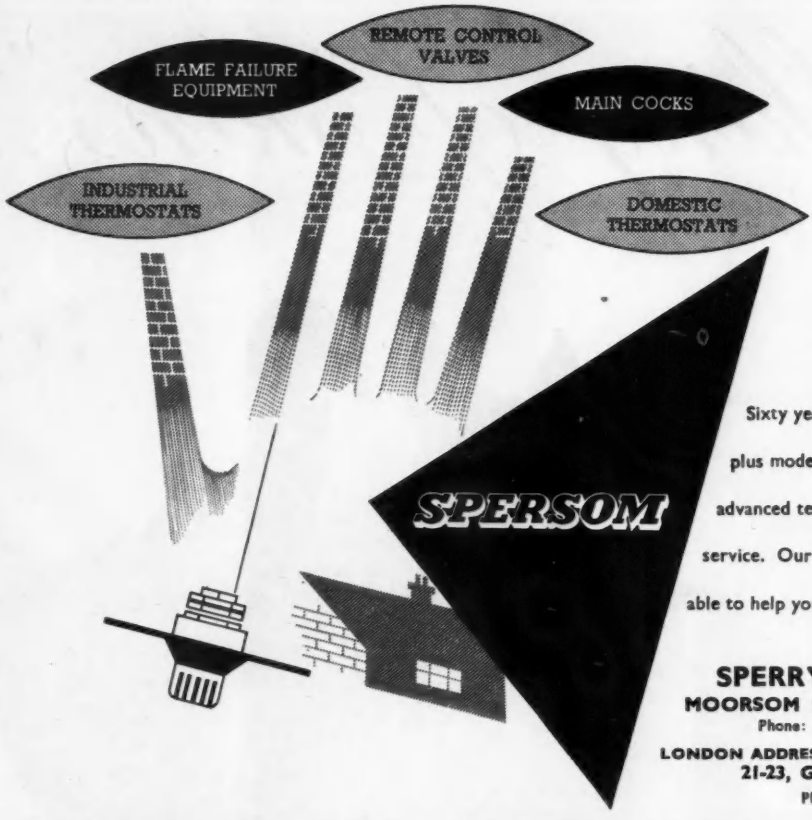

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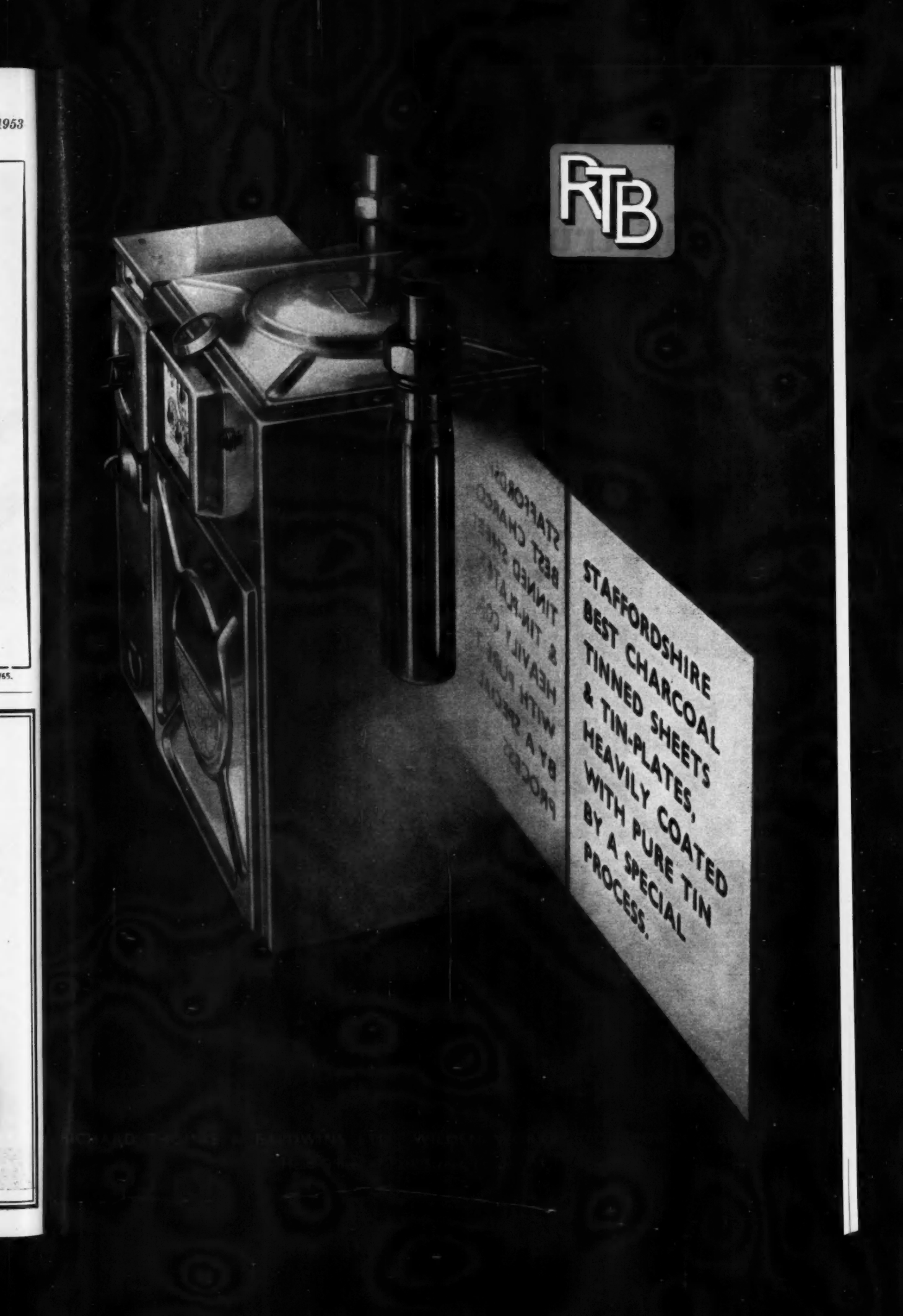
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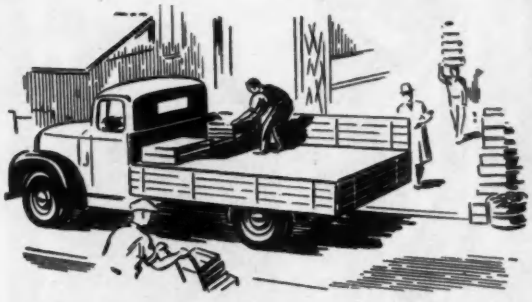

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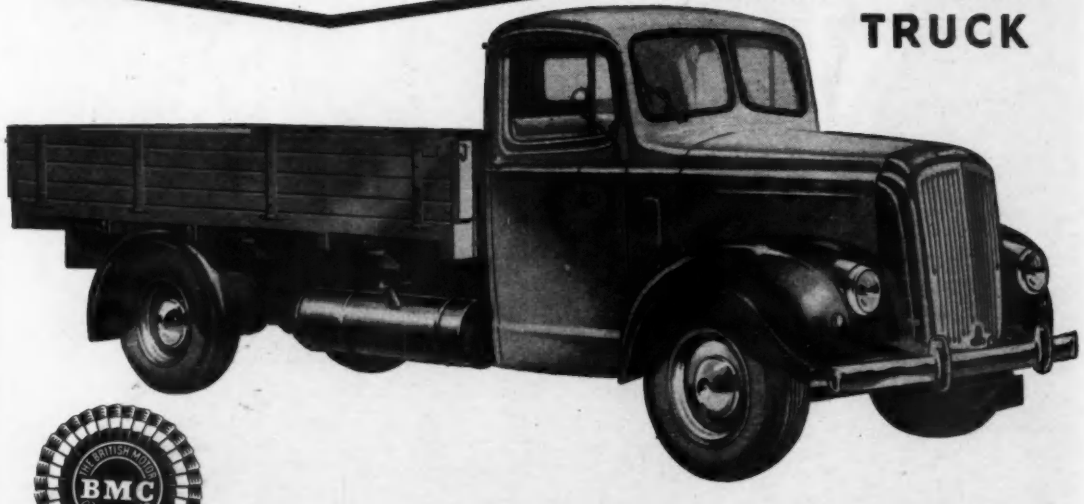

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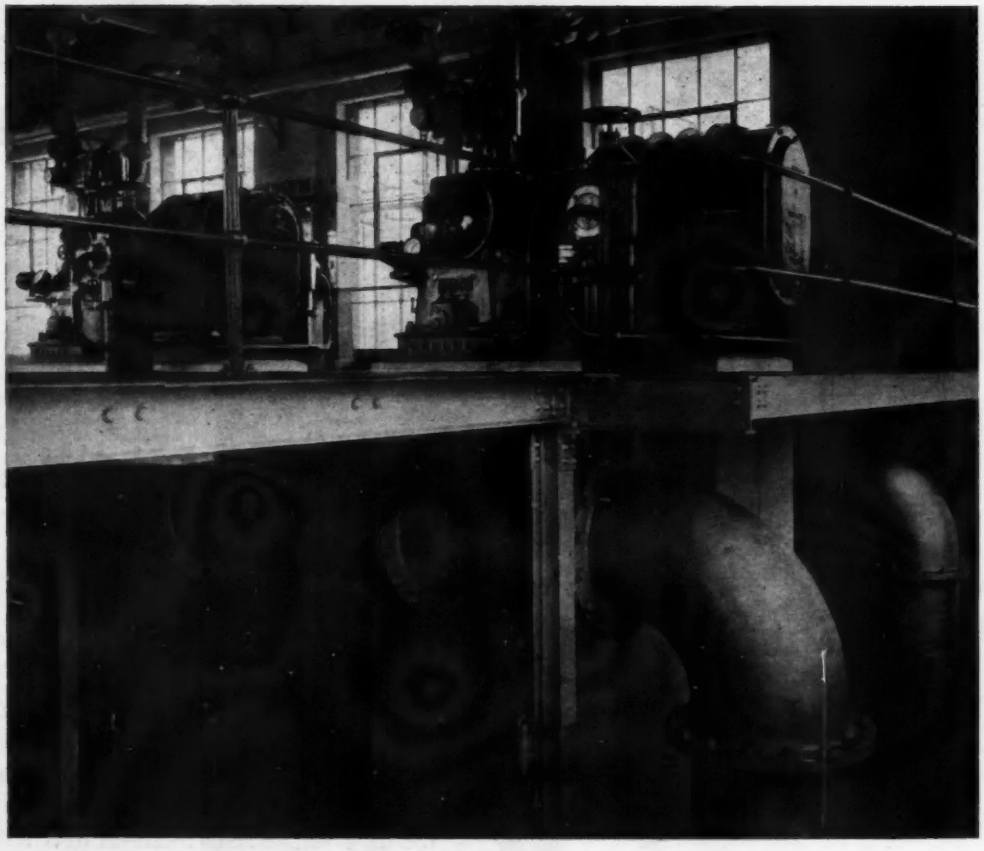

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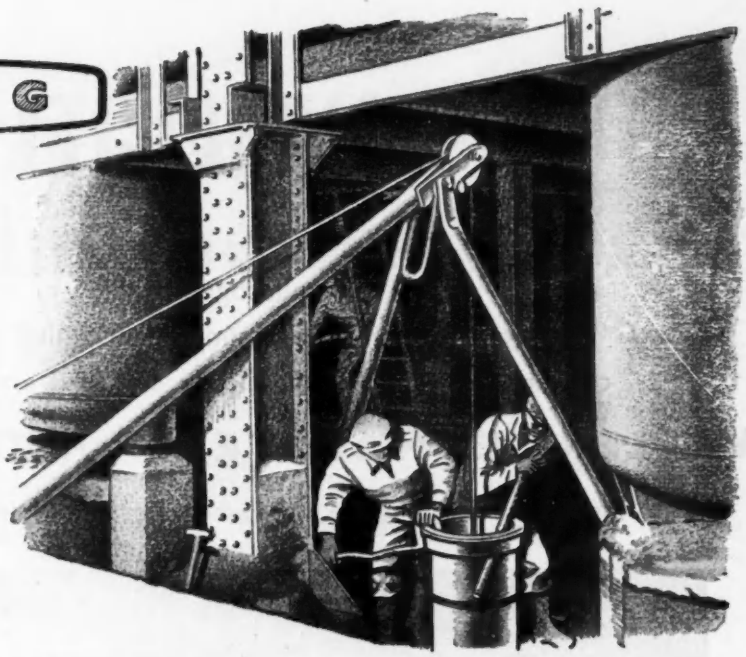

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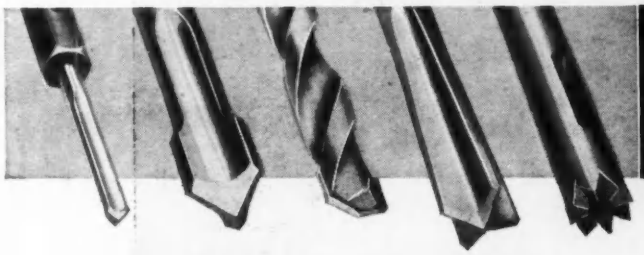

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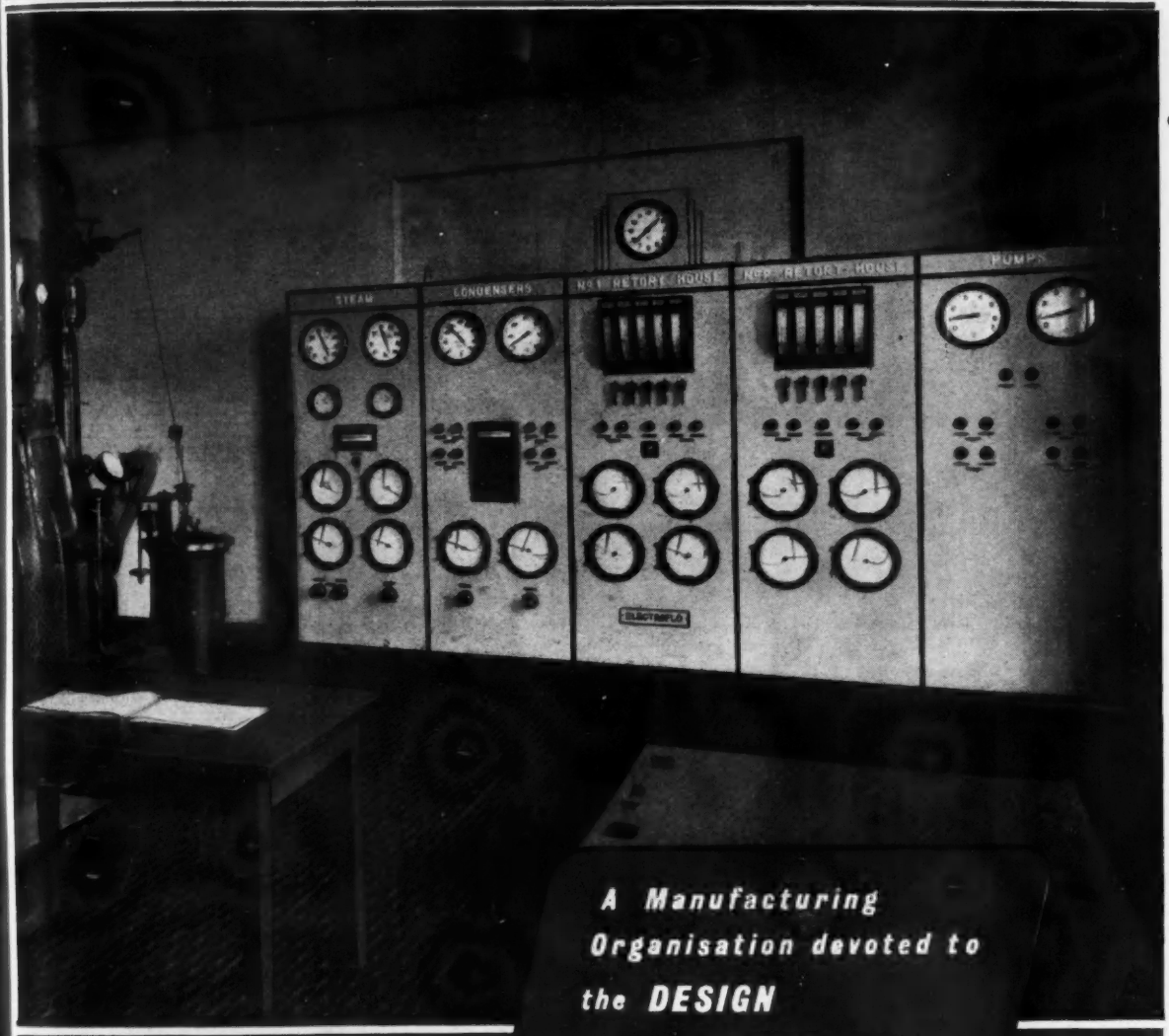

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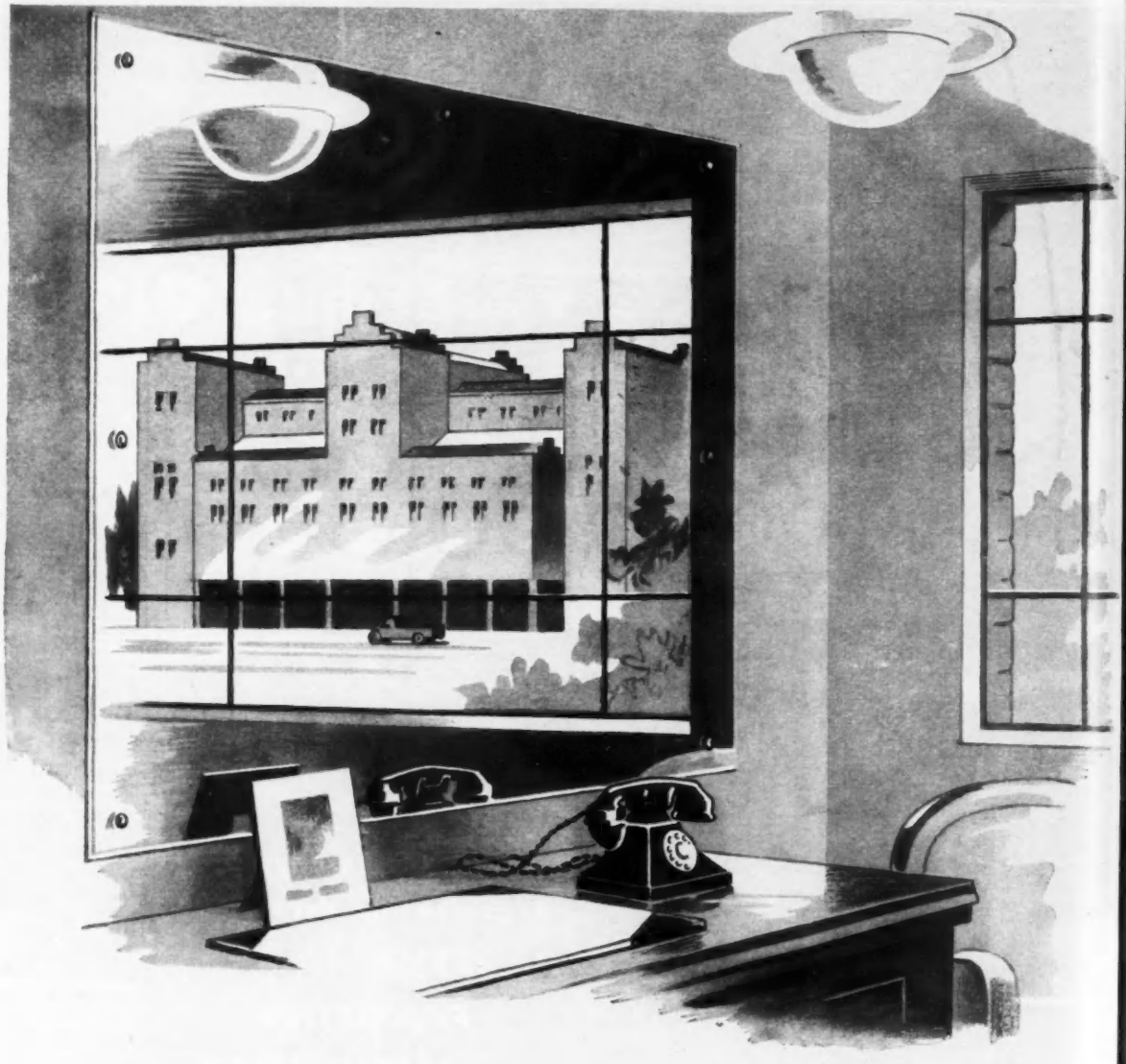

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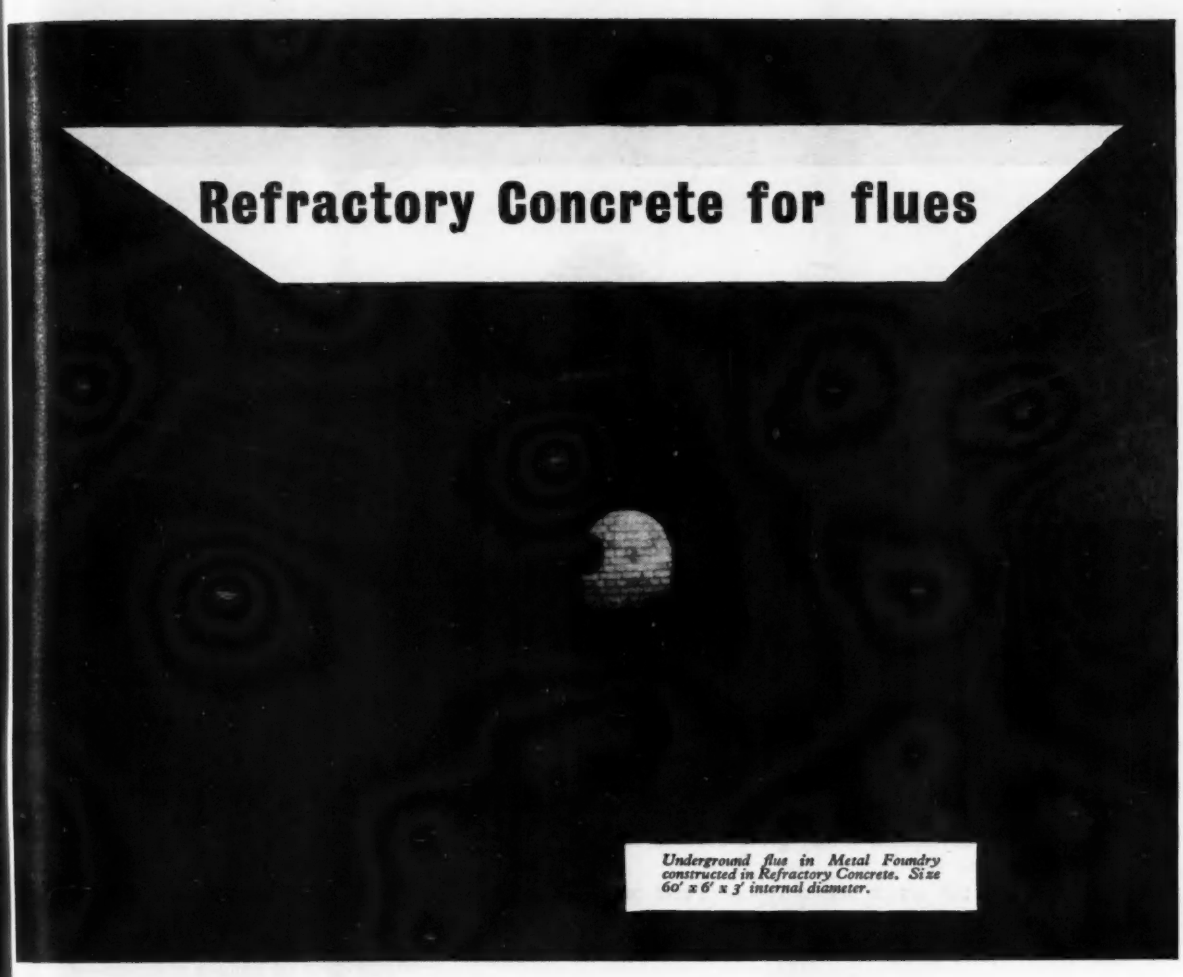

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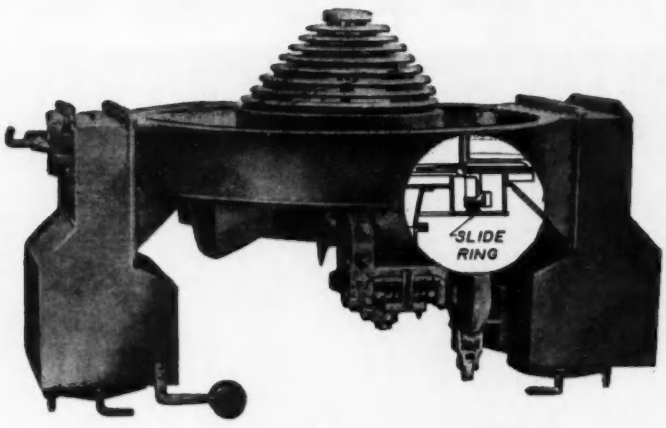

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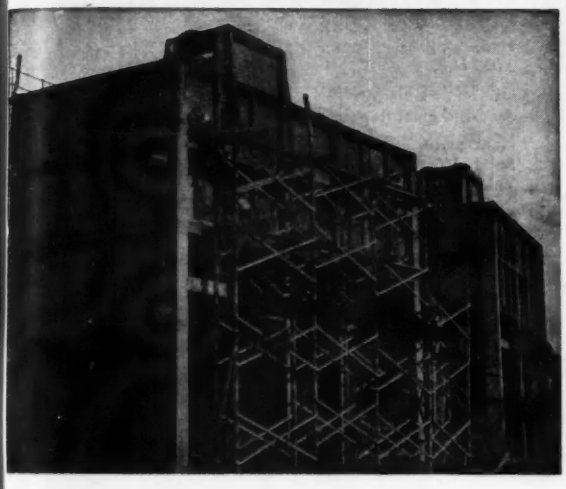

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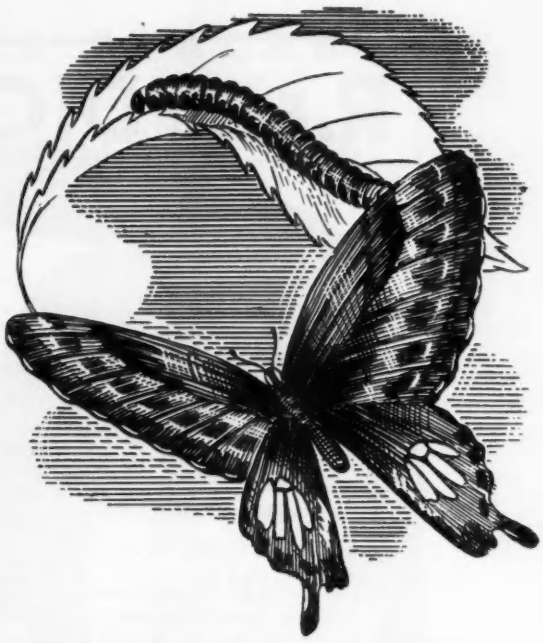

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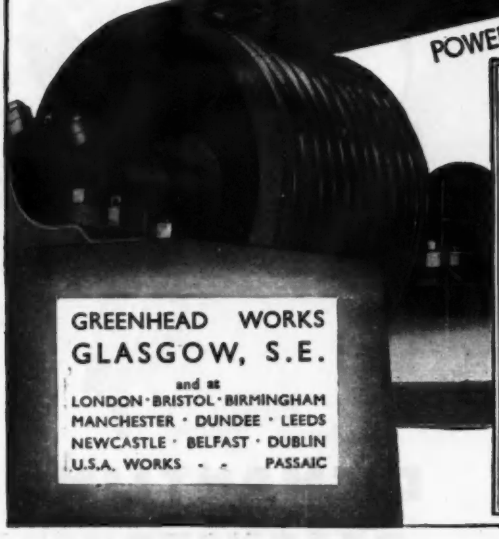

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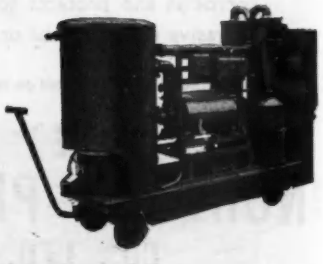

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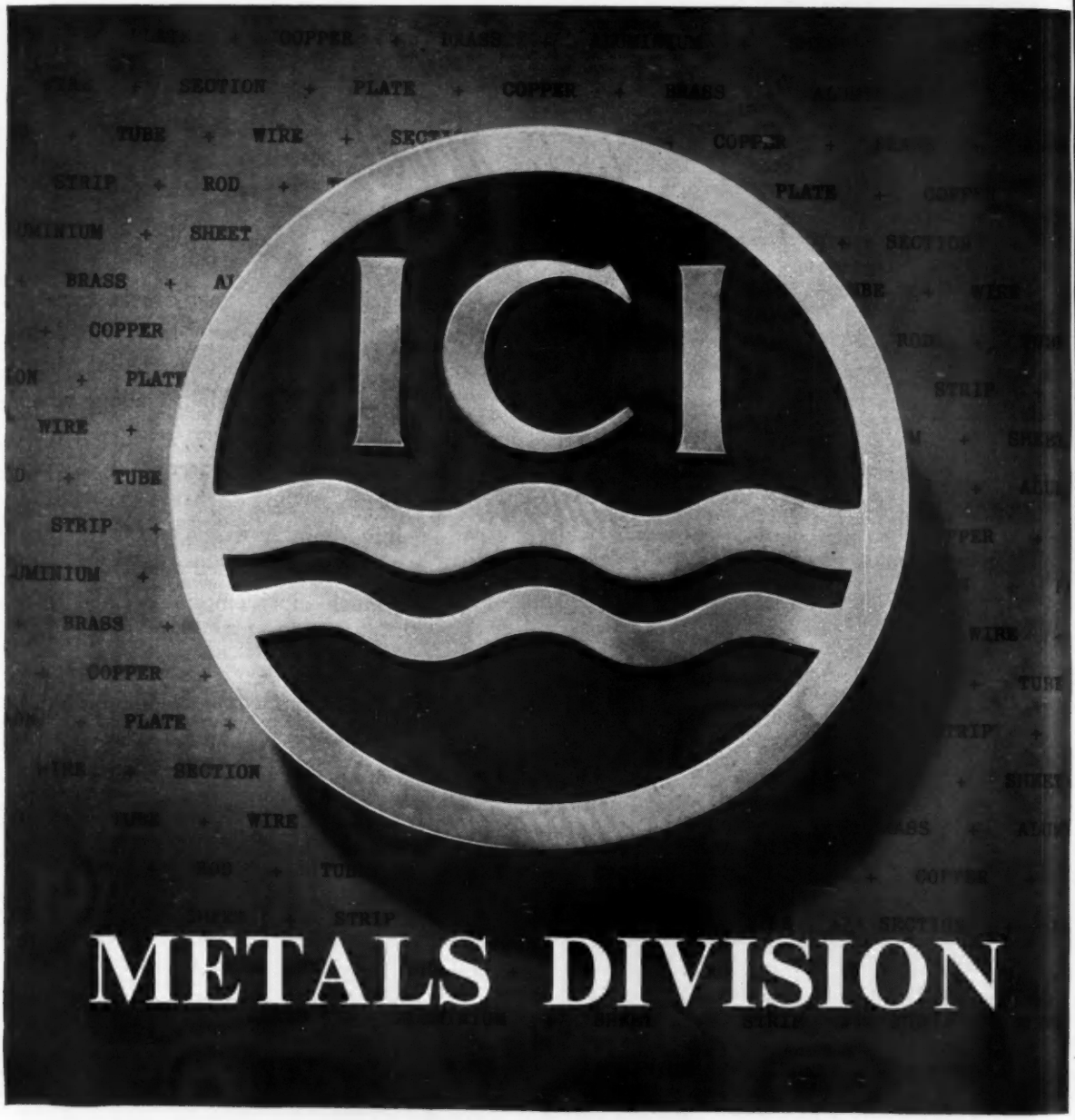

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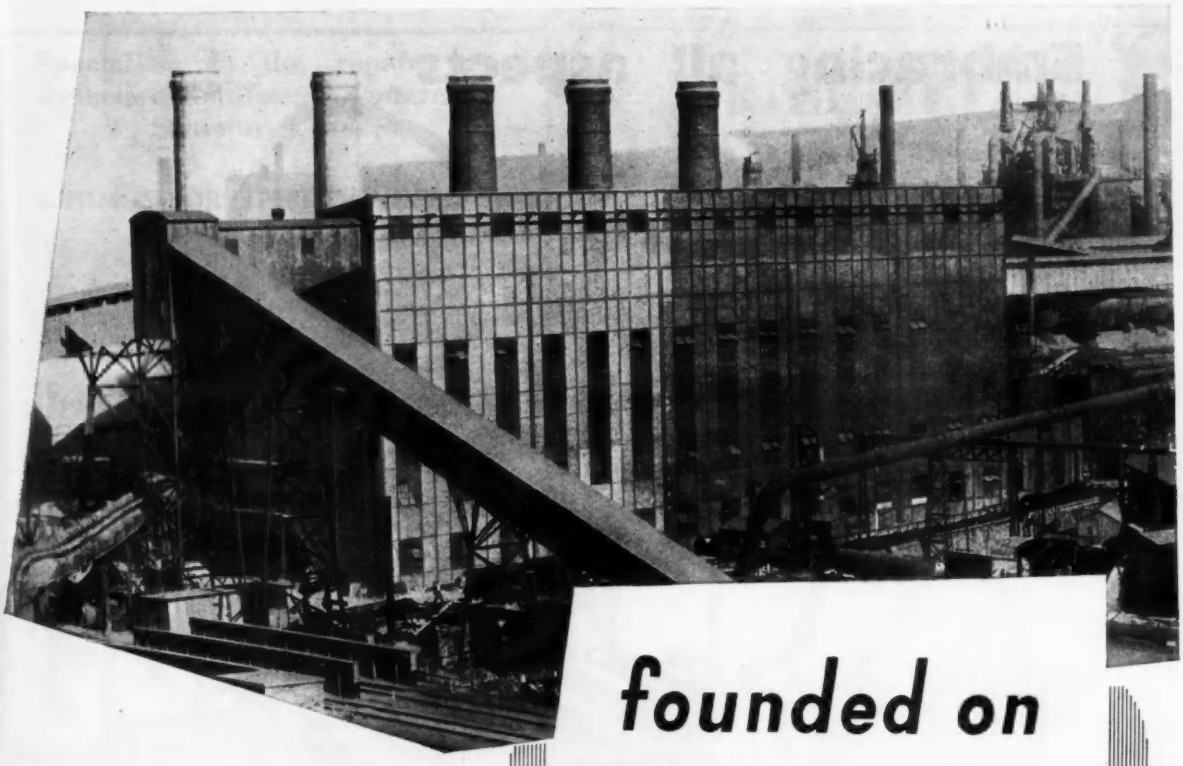

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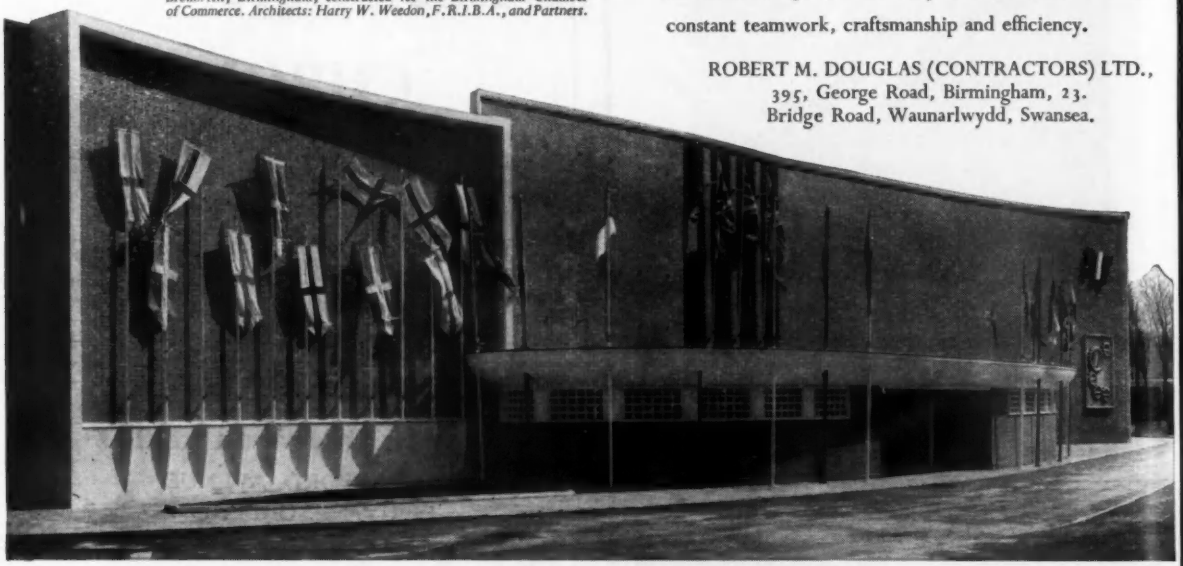

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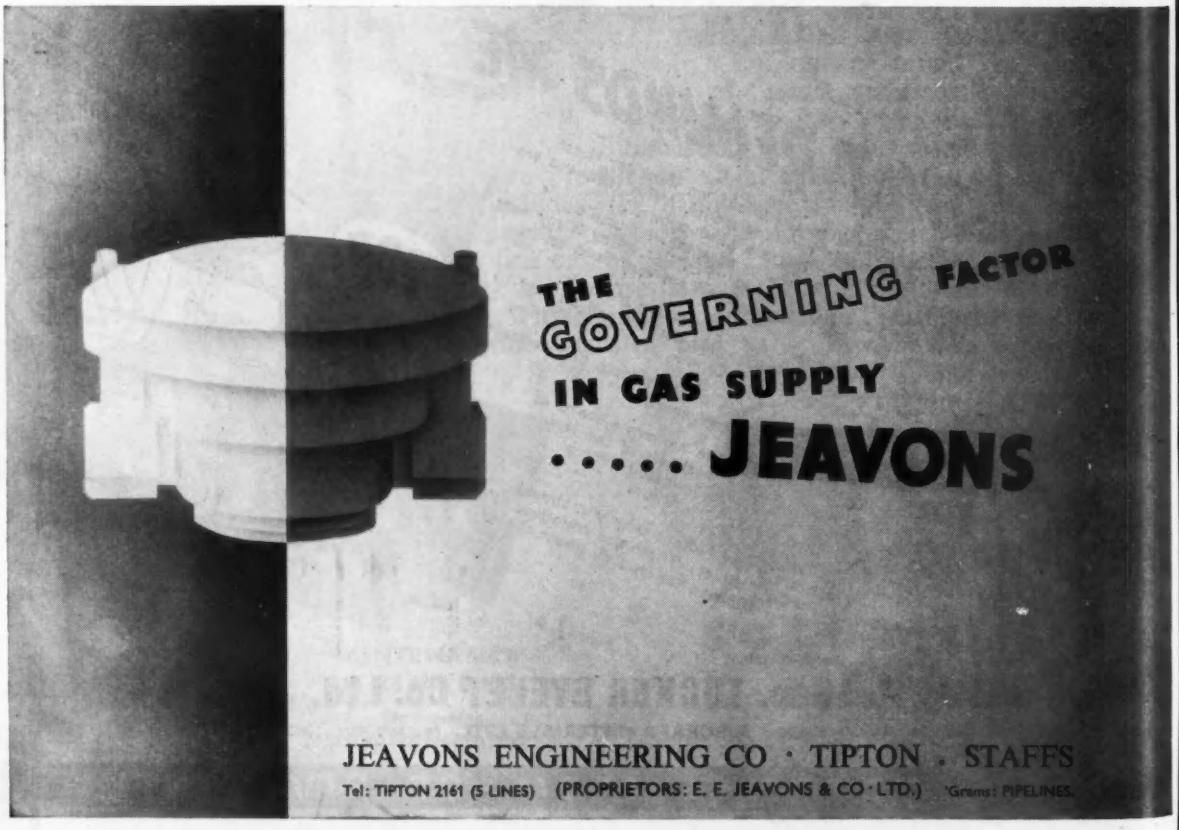
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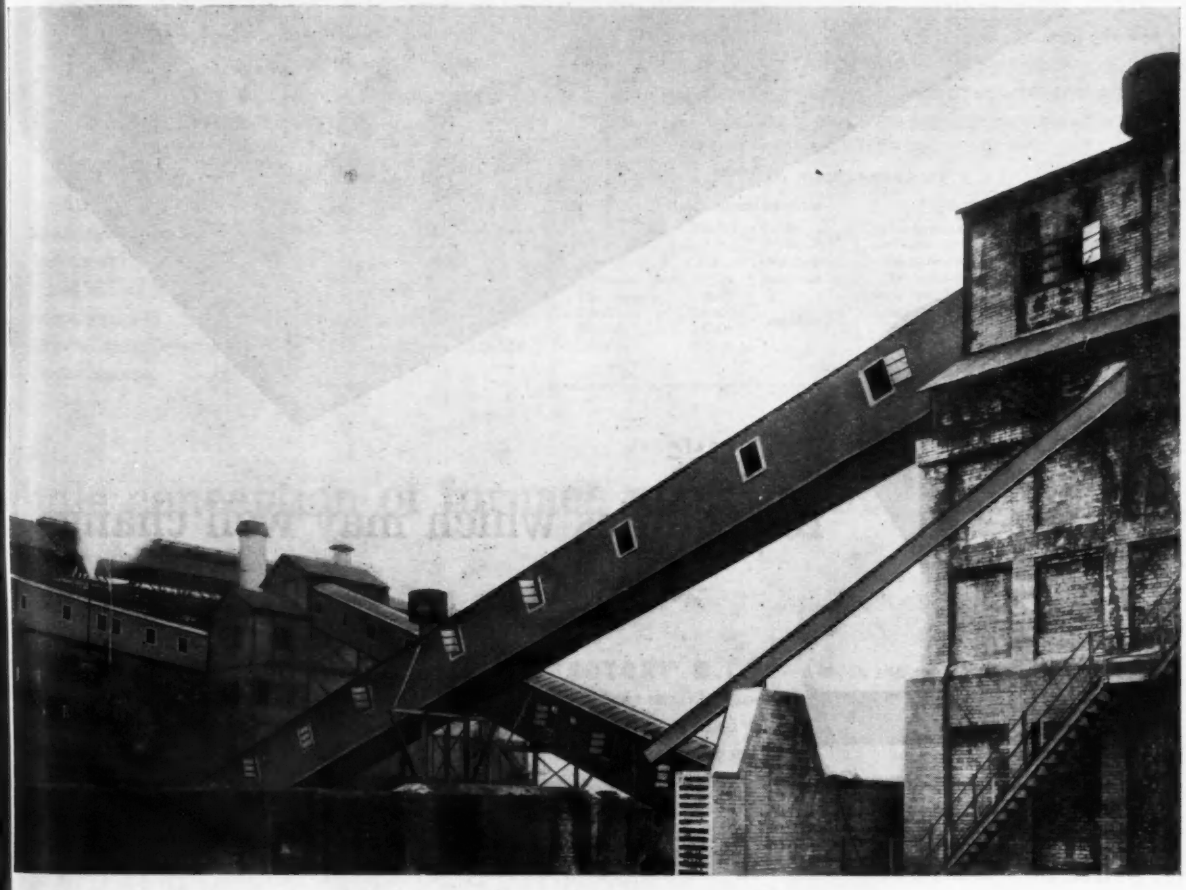

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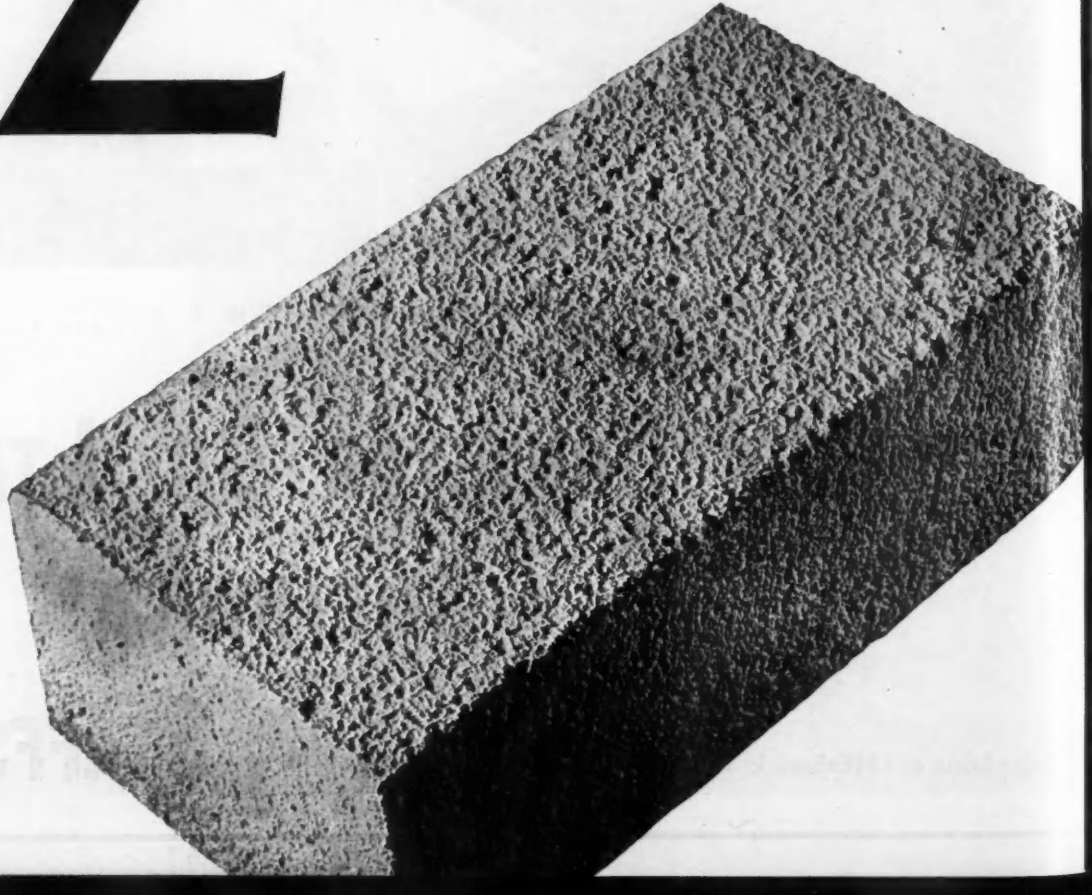

FURNACE MAINTENANCE

✻ THE MORGAN M.R.1

—a brick that carries the ordinary high quality firebrick into entirely new fields of usefulness. It can be used, for example, at temperatures as high as 1600°C—far beyond the capacity of other refractories of similar alumina content. In fact, with these bricks, this standard of comparison is no longer valid. They can be judged only on performance and in that they are comparable only with special purpose refractories having a very high alumina content indeed.

How is it done? The answer is in the way they are made: in the selection and purification of the clay; in the unusually hard burning and careful grading of the grog; above all in the very high temperature of the final firing. The manufacturing process is a continuous one—which in itself makes for uniformity—and it is carried out under rigorous quality control.

All this costs money—but consider what its results mean in practice. Remarkable rigidity up to 1600°C; an after-contraction at this temperature of only 1% (The usual temperature for measuring after-contraction is 1410°C); negligible after-contraction below 1600°C. The bricks are close textured and strong, their resistance to abrasion is high; and they have unusually good resistance to both thermal and physical spalling.

Bricks of this type, although not previously manufactured in this country or in Europe, have been in use for some years in the U.S.A. where they have decisively proved their economy in terms of reduced furnace maintenance.

TYPICAL PROPERTIES OF M.R.1

Approximate Chemical Analysis		
Silica	(SiO_2)	52/53%
Alumina	(Al_2O_3)	43/44%
Iron Oxide	(Fe_2O_3)	less than 1%
Titanium Oxide	(TiO_2)	less than 1%
Magnesia	(MgO)	less than 2%
Lime	(CaO)	
Potash	(K_2O)	
Soda	(Na_2O)	

Physical Characteristics	
Refractoriness ...	Cone 35 (1770°C)
Refractoriness under load (25 lb./sq.in.): Commencement of subsidence 1600°C: 10% subsidence 1700°C	
Bulk density ...	132 — 137 lb./cu.ft.
After-contraction (2 hrs. 1600°C)	less than 1.0%
Thermal expansion ...	4/5 x 10-6 per °C.

whole conception of furnace maintenance and efficiency

✻ THE MORGAN LOW STORAGE REFRACTORY M.I.28

—a brick that can double furnace output. It is a hot-face insulating refractory which can be used at furnace (or interface) temperatures up to 2800°F (1538°C).

At these temperatures it has a lower conductivity than any other type of refractory; and therefore provides a greater reduction in the convection and radiation losses from the outside of the furnace. But that is less than half the story: even more important is the reduction in heat storage. The M.I.28 is little more than a third of the weight of an ordinary refractory; consequently only a third of the heat is required to raise the whole of it to the same temperature. But, with the same furnace temperature, the average temperature of an M.I.28 is much lower (owing to its lower conductivity) and this still further reduces the heat it takes up. With the same heat input, therefore, furnaces built from M.I.28 bricks heat up rapidly: on batch furnaces this can amount to a doubling of the furnace output—to say nothing of the saving in fuel. Low conductivity also has a bearing on the effective strength of the brick. For, even when working at high face temperatures, the greater part of the brick is relatively cool. Not only this but their light weight reduces the load on the lower courses and, incidentally, the weight of the whole furnace structure.

There have been hot-face refractories before. What, then, is new about the M.I.28? In theory nothing. Again it is a matter of the way they are made. Morgans have put the whole of the theory into practice. The plant is entirely new in design and operates under rigorous quality control from the purification of the clay to the final grinding to size.

As in the case of the M.R.1, bricks of this quality have been available for some years in the U.S.A. and the improvements they can make in furnace efficiency have been firmly established.

TYPICAL PROPERTIES OF M.I.28

Maximum Service Temperature	1538°C (2800°F)
Thermal Conductivity:	
Mean Temperature	538°C (1000°F) ... 2.4 B.Th.U/hr.(sq.ft.)(in.)(°F)
	816°C (1500°F) ... 2.9 B.Th.U/hr.(sq.ft.)(in.)(°F)
Bulk Density	47.5 lb./cubic ft.
Refractoriness	1710°C (3110°F)
Modulus of Rupture	greater than 120 lb./sq.in.
Heat Capacity Factor	0.105
(the ratio of the heat stored in a M.I.28 furnace wall relative to that stored in a firebrick wall of the same area, and of a thickness giving similar hot and cold face temperatures)	

MORGAN refractories ARE WORTH FAR MORE THAN THEY COST

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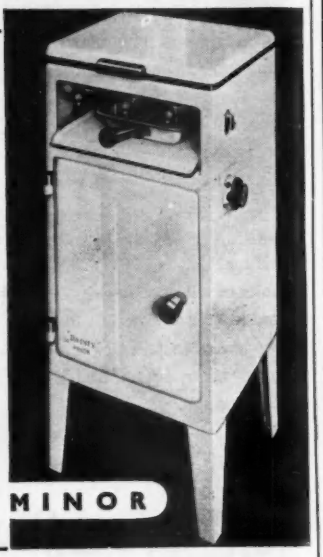
Approved and adopted by leading gas boards

The **Dainty** MINOR



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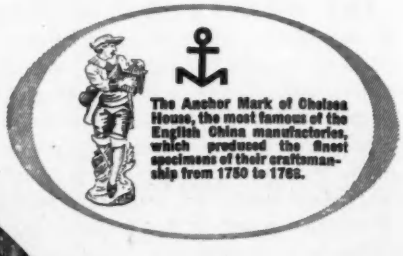

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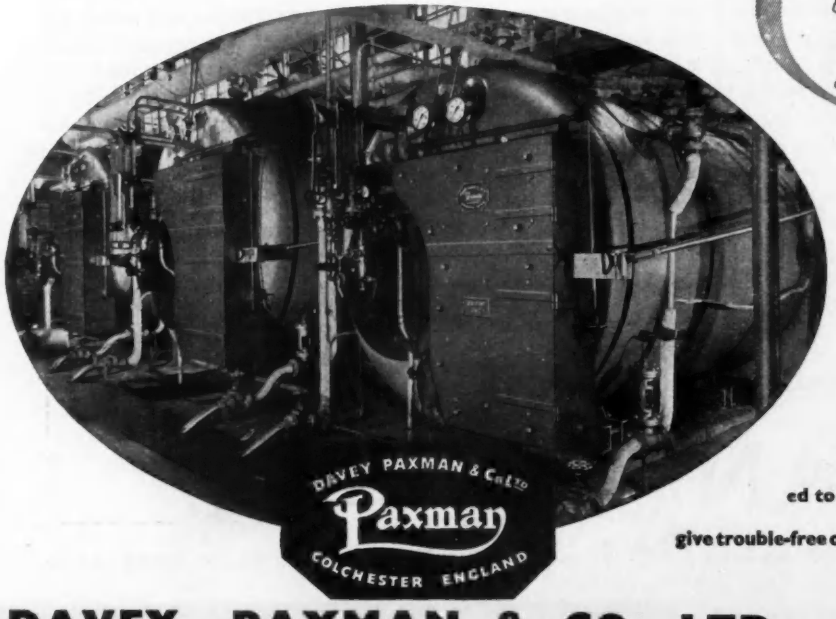

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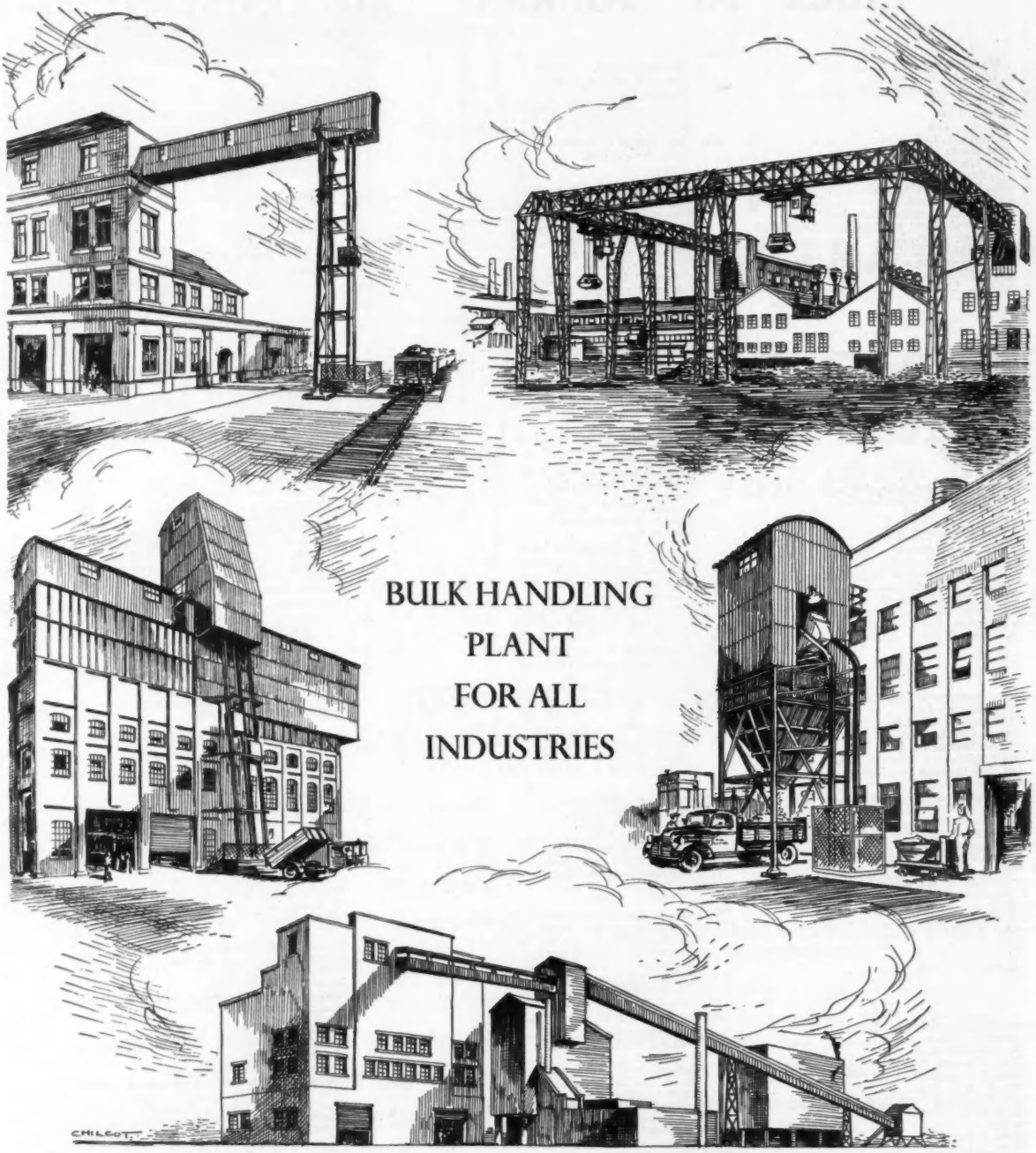

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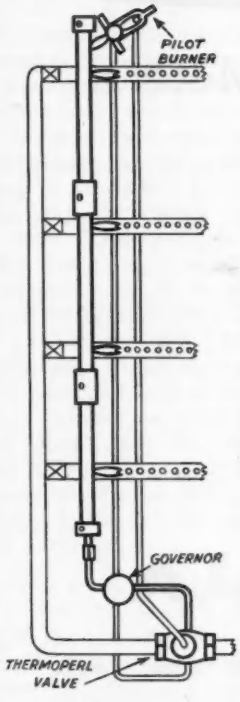

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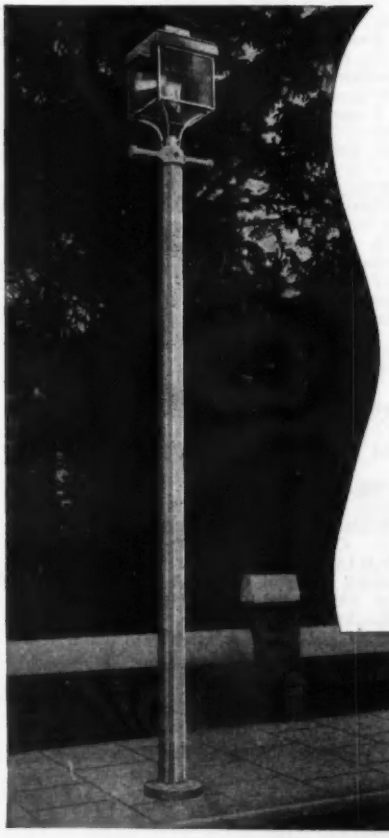

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GAS JOURNAL

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AN ENCOURAGING BUDGET

THE widespread feeling after Mr. Butler's second Budget is that it gives rise to a more hopeful outlook generally—and that is what we badly need in Great Britain today to release our latent abilities and to show ourselves more definitely, more determinedly, more energetically to the world. The 1953 Budget should help to relieve that grievous sense of frustration which has hung like a black cloud over our activities in recent years. There has been a general lightening of the burden which ought to act as incentive in this Coronation year. In its broader issues the Budget should help the gas industry in common with other industries, and in the term 'gas industry' we include the manufacturers of gas-making and gas-using equipment. Of particular interest is the partial restoration of the allowances for the initial costs of plant. Also of particular interest are the purchase tax reductions announced by the Chancellor, though it may well be queried whether the maximum rate should not have been brought lower and the spread between the rates made still narrower.

In the event, where formerly the purchase tax was 66⅔% it is now 50% and the 33⅓% rate becomes 25% —a step in the right direction, but a tax of 50% on space heaters, water heaters, and refrigerators, among certain other gas appliances, is in fact no small burden. The issue, however, does not end there. Very strong and very responsible representation has been made to the Chancellor that there should be a lessening of the incidence of the Hire Purchase and Credit Sale Agreements (Control) Order which came into operation on February 1, 1952, and which has had a most marked and most serious effect on the business and the plans of gas appliance manufacturers, especially those in the water-heater field. This Order remains a real stumbling-block to progress in both the home and the export markets. The whole position has been ventilated and discussed in our columns this year, and it is to be hoped that further representation will be put forward that something should be done to lower or eliminate this formidable barrier. When one considers this burden and takes into consideration the oncosts and fixing costs which gas appliances have to carry the drop from 66⅔% to 50% in purchase tax, though a pleasant gesture and, as we have said, a step in the right direction, does not go a long way to help in actual practice. At the moment it is to the general upsurge of optimism in outlook that we must look for benefit.

COAL SUPPLIES IN SCOTLAND

WHEN the Fuel Research Board issued in 1946 its Rapid Survey of Coal Reserves (Survey Paper No. 58) the information available about the Scottish coalfields was such as to yield only a first approximation to the true figures. Dr. E. A. C. Chamberlain, Chief Scientist to the Scottish Coal Board, in a paper on 'Coals for Carbonisation and Gasification in Scotland,' presented to the Scottish Junior Gas Association (Eastern District), infers that more complete information is now available. But, although it is good to learn that the position can be regarded as 'not so bad as it first appears,' it cannot be said that his picture is very different from that depicted in the Rapid Survey. The developed reserves of the Central coalfield are inadequate to sustain the pre-war output for much more than 50 years and, though there are, as Dr. Chamberlain assures us, and as the authors of the Rapid Survey were not unaware, reserves at an economic depth in the Alloa area, presumably what the F.R.B. meant by 'the northern area,' it is not claimed that these are so large as materially to affect the position. Particularly serious is the situation in regard to coking coals of which, as Dr. Chamberlain informs us, the workable reserves, according to figures now available, will last only some 50 to 60 years.

Scottish gas engineers have complained for some years of the deterioration in quality, as measured by ash content, of the coals supplied to them. This is not surprising when one reads that many seams have bands of dirt

running through the coal to such an extent that they may have a sandstone roof, 6 in. of coal, 3 in. of clay, 2 ft. of coal, 6 in. of shale, 3 in. of coal, and a fireclay floor, and that already in Scotland 10% of the output comes from seams less than 24 in. thick, while in Lanarkshire, where reserves of coking coal are rapidly running out, over 60% is mined from seams less than 24 in. thick.

It is clear that the big reserves of Scottish coal are those of the not very strongly coking type, rather below than above 500 in the Fuel Research Board's scale. It is only natural, too, that although coals of the ranks 600 to 800 can be and are dealt with very easily in the continuous vertical retort, the coking industry claims the pick of the coking coals. What is the Scottish gas industry to do about it? In the immediate future something could be done by increasing the gaseous thermal yield from existing coals; in present-day practice, for instance, by keeping the calorific value of gas distributed down to 400 B.Th.U., already the figure widely adopted in Scotland, and that in spite of the fact that some of the coals now being increasingly developed in, for example, the East Fife coalfield, will readily produce gas at 500 B.Th.U. The continuous vertical retort may be said to be 'at home' in Scotland. It can make gas from practically all the Scottish gas and coking coals at 400 B.Th.U. with optimum thermal efficiency and with optimum gaseous thermal production per retort. But eventually the shortage of these coals will be inescapable and revolutionary changes will have to be considered in the utilisation of the dwindling reserves. Gas will have to be made from practically non-coking coals.

Blending and pre-treatment may be effective in the production of coke from the low-rank coals which, it must be recognised, form the major output from the Scottish Division. But one cannot see a definite solution on these lines for gas-making. Rather is one forced to the consideration of processes other than carbonisation. As Dr. J. G. King has put it, 'Processes of complete gasification provide a better answer to the problem of utilising weakly coking coals for gas manufacture.' The gas industry in Scotland may very well be interested before that in England in the work described and foreshadowed by Dr. F. J. Dent in the Birmingham programme presented to the Institution of Gas Engineers last autumn. Dr. Chamberlain makes the statements that coke is not generally acceptable as a domestic fuel (which may be more true in Scotland than it is in England owing to its poorer quality there) and that the demand for industrial coke may be better met by the coke oven. Scotland may be the first to abandon the attempt to function as a two-fuel industry.

However that may be, some of Dr. Chamberlain's introductory remarks and their implications should be laid to heart throughout the British gas industry. Once again he calls attention to the deplorable lack of urgency in considerations of the nation's plight in respect of coal supply. There is no going back to some golden age in the past when coal was plentiful and cheap. It is not possible to produce again what has already been used. We must repudiate those aspects of the fuel efficiency campaign which give the impression that this is a passing phase from which we may recover by economies here and there. The demand for coal by the electricity and gas industries and by industry in general is rapidly outstripping the rate of production as well as depleting the reserves. We must face the fact that revolutionary changes in all our uses of coal must take place if we are to survive as a first-class nation.

LLANDUDNO RE-VISITED

THE Wales and Monmouthshire Section of the Institution of Gas Engineers re-visited Llandudno last week for its Spring Meeting—its third as a section but its 48th as an organisation of gas engineers in Wales. It was the fifth occasion on which members had paid a corporate visit to the north coast, the seat of the holiday making 'industry,' and the second visit to Llandudno. The first was the meeting at Prestatyn in 1946 when under the Presidency of Mr. O. P. Cronshaw the amalgamation of the small North Wales association with the older and larger 'Wales and Mon.' was celebrated. The ideal of appointing a president, latterly a chairman, alternately from north and south is impracticable because of disparity in numbers, but there seems to be no reason for not alternating the venue; thus when Mr. F. Dupont, of Brecon, was President in 1948 the members again visited Prestatyn, and a year later Mr. H. Blythe welcomed his colleagues to Colwyn Bay. Mr. Powdrill, of Pontypool, took the chair in 1951 and the meeting was held at Llandudno.

Despite the cold and rainy weather—the meeting was a few weeks earlier than normal this year because of the heavy Coronation Year programme—it was a very enjoyable meeting, but by no means a holiday. Since the previous Llandudno meeting Mr. Powdrill has been translated from the exalted office of chairman to the responsible post of hon. secretary and has thus reversed an old tradition in Wales that when the Section wants to do signal honour to its secretary it appoints him as chairman. Mr. K. E. Tiddy, secretary for some years until his election last autumn as senior vice-chairman, will in the normal course take the chair at the next meeting and, unless he strikes new ground, next year's Spring Meeting will be held nearer to his home town of Carmarthen. Much of the success of such a meeting depends on the secretary, and looking back over the crowded programme at Llandudno it will be agreed that Mr. Powdrill is worthy of congratulation. The technical fare, the *raison d'etre* for the whole gathering, comprised at the morning session Mr. H. Maycock's Chairman's Address and a paper on intermittent vertical chamber ovens by Mr. R. W. Crowther, Director of W. J. Jenkins & Co., Ltd. In the afternoon we had renewed opportunity of listening to two papers already presented, one by Mr. L. J. Clark (North Thames) on steam and power in the gas industry, first presented in Brussels last year, the other by Mr. M. S. Gaskill, of West's Gas Improvement Co., Ltd., on fuel economy in the industry, first heard at Tenby 12 months ago. The social programme —official lunch, golf, dancing, and films—went off happily; only the bowls competition was cancelled, and that because the heavy rain rendered the greens unfit for

play. The meeting was well attended and the gathering included the President and Secretary of the Institution, the Chairman and a member of the Wales Gas Board, and, by way of personal honour to the Chairman, the Chairman and Secretary of the former British Gas Light Company which owned the undertakings of which Mr. Maycock is chief official.

Mr. Maycock has spent 19 years in Wales, the first 12 with the municipal undertaking at Abertillery, and latterly with, until vesting date, the British Gas Light Company's undertakings at Holywell-Flint and Ruthin. It is not given to many Englishmen to work in south and north Wales in turn but Mr. Maycock was able, in the two distinct sections of his address, to recount progress and achievement in both. At Abertillery he saw the output grow from 90 mill. to 153 mill. cu. ft. per annum. At Holywell-Flint the output grew from 115 mill. cu. ft. in 1945 to 161 mill. cu. ft. in 1951, and at the much smaller Ruthin undertaking in the same period the output increased from 19 mill. to 25 mill. cu. ft. In south and north he took over works that were in need of repair and reconstruction and if his address reads in parts rather like a catalogue it is because of the wide field of jobs that had to be done. Holywell was one of the first of the British Gas Light Company's stations; 106 years ago the people of Flint petitioned for a supply but the directors could not comply with the request, so Flint formed its own gas company, which was acquired by the B.G.L. in 1931. Gas was first supplied from Holywell to Flint in 1934, 87 years after the original petition. Ruthin is one of those many small undertakings in Wales that are too far removed from larger works to be capable of benefiting from bulk supplies. But since Mr. Maycock took over the management in 1946 quite a lot of reconstruction has taken place and a consumer sales and service scheme has met with considerable success.

Personal

Mr. E. Gooden, A.R.I.C.S., Assistant to the Midland Divisional Surveyor of the Road Haulage Executive, has been appointed Surveyor to the West Midlands Gas Board.

◇ ◇ ◇

Mr. J. B. McCormack has been appointed a Technical Representative of Electroflo Meters Co., Ltd., to deal with the company's interests throughout the gas industry. He will assist Mr. L. James, Manager of the Gas Industries Division.

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Major W. J. Brown, Works Director of Ashmore Benson Pease and Co., Ltd., Stockton-on-Tees, has received an award to mark his completion of 25 years service. Major Brown, who is in charge of the blast furnace department, is also a Director of the Power-Gas Corporation, the parent company.

◇ ◇ ◇

Mr. W. G. Daw, a Senior Section Clerk at the Exeter Sub-Division of the South Western Gas Board, is Sheriff-designate for the City and County of Exeter for 1953/1954. He has for many years interested himself in public life, being first elected to the Exeter City Council in May, 1942. He became an Alderman in January, 1952, and has been Chairman of the Housing Committee since November, 1947.

Mr. Arthur Edward Biggs has been appointed Secretary of the Staveley Iron & Chemical Co., Ltd. He succeeds **Mr. James Carmichael,** who has retired after 23 years as Secretary Mr. Biggs has been with the company for over 40 years, since 1927 as chief cost accountant. He has served also for a number of years as secretary to several ironstone-producing undertakings connected with the Staveley Company.

◇ ◇ ◇

Mr. John A. Franklin will relinquish his appointment as Home Sales Manager of Ascot Gas Water Heaters, Ltd., at the end of April, to take up the position of Sales Manager with Sidney Flavel & Co., Ltd., on May 4, and will be directly responsible to Mr. F. M. Rogers, the Sales Director. **Mr. G. N. Behr,** at present London Manager of Ascot Gas Water Heaters, Ltd., will succeed Mr. Franklin as Home Sales Manager.

◇ ◇ ◇

Mr. W. C. Campbell, Sub-Group and District Manager, Galashiels, has been appointed District Manager at Paisley. **Mr. William Kirk,** District Manager, Motherwell, has been appointed District Manager, Greenock. The Port Glasgow undertaking has been absorbed into Greenock for administrative purposes, and will be under the charge of Mr. Kirk. The Stevenston undertaking has been amalgamated with Saltcoats, and will be under the charge of **Mr. F. B. Oliver,** District Manager, Saltcoats. **Mr. R. F. Bell** (Falkirk) has been appointed District Manager, Irvine.

◇ ◇ ◇

Dr. Leonard C. Tyte has been appointed Director of the National Coal Board's second central research establishment at Isleworth, Middlesex, which is engaged on investigations of the underground problems of the industry. Dr. Tyte will be responsible to the Director-General of Research, Dr. W. Idris Jones, at headquarters. After a period of post-graduate research at London University under Professor C. H. Lees, he joined the Government Scientific Service at the Research Department at Woolwich Arsenal and latterly has been engaged on projectile research. He was promoted Deputy Chief Scientific Officer in 1950 and was Technical Director under Sir William Penney at the Monte Bello Trial.

Diary

April 28.—Midland Juniors: Annual General Meeting; Staff Mess Room, West Midland Gas Board, Council House, Birmingham.

April 28.—Institute of Fuel: 'Refractory Recuperators,' Professor A. L. Roberts, Dr. N. L. Franklin, and Mr. F. H. Cass, at the Institution of Mechanical Engineers, Storey's Gate, 5.30 p.m.

April 27-May 8.—British Industries Fair, Castle Bromwich. Gas Council Stand No. D.641/540.

April 30.—North Thames G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2.

April 30-May 2.—East Midlands Gas Board: Fourth Annual Staff Conference, Skegness.

May 1.—London Juniors: 'Southampton's Gas Distribution System,' R. K. Harrison. 178/180, Edgware Road, W.2, 6.30 p.m.

May 5.—East Midlands G.C.C.: Victoria Station Hotel, Nottingham, 11.30 a.m.

May 7.—North of England Section, I.G.E.: Annual General Meeting, Old Assembly Rooms, Newcastle-on-Tyne, 11.30 a.m.

May 7 and 8.—Combustion Engineering Association: Annual Conference, Palace Hotel, Buxton, 10 a.m.

May 7.—Manchester, Yorkshire, and Wales (North) Juniors: Joint visit to Gaythorn and Partington works, Manchester, 11.30 a.m.; 'Producer Gas in the Gas Industry,' I. J. Harthill, 5.30 p.m.

May 9.—Midlands Juniors: Visit to the works of the Widnes Foundry and Engineering Co., Ltd., leaving Birmingham 8.30 a.m.

May 11-16.—Glass Industries Exhibition, New Horticultural Hall, Westminster. Gas Council exhibit.

NEW SCRAP DEPOT OPENED IN BELFAST

A group taken at the opening of the new Belfast scrap depôt of George Cohen, Sons & Co., Ltd. The Rt. Hon. W. V. McCleery, D.L., M.P., Minister of Commerce, Government of Northern Ireland, who performed the opening ceremony, is in the centre of the picture—with walking stick. On left are Mr. John Martin, the firm's Manager in Belfast, and Mr. Felix L. Levy, Director.

THE RT. HON. W. V. McCLEERY, D.L., M.P., Minister of Commerce, Northern Ireland, opened a new scrap depôt established by George Cohen, Sons & Co., Ltd., in Sydenham Road, Belfast, on April 1. After the Minister had officially declared the depôt open by hoisting a '600' flag, he made a tour of the premises, accompanied by guests, who included members of his Ministry staff, representatives of firms in the iron and steel industries to which Belfast normally supply scrap, and representatives of large business concerns in Ulster.

Scrap-yards do not lend themselves very well to social functions, but a corner of the large new metal house, where non-ferrous scrap is stored and sorted, was transformed for the day into a pleasant luncheon room.

After luncheon, Mr. Felix L. Levy, a member of the Board, presented the Minister with a souvenir of the occasion in the form of a silver salver, on the obverse of which was an inscribed plaque. The plaque of aluminium alloy on which the inscription was engraved once formed part of the roof of the Dome of Discovery, erected at the Festival of Britain Exhibition, 1951, and dismantled in 1952 by George Cohen, Sons & Co., Ltd.

In the afternoon a buffet tea was held for all the employees of the depôt and members of their families. In the evening, to round off the memorable day, Mr. Felix Levy entertained visiting Directors and the office staffs of the Belfast scrap and machinery depôts at dinner at the Midland Hotel.

Oil Storage on Tees-side

MR. C. T. BRUNNER, President of the Institute of Transport, and a Director of Shell-Mex, and B.P., said in a speech at Saltburn on March 27, on the post-war development of Middlesbrough and Tees-side, that Shell was planning to establish a big new oil storage installation at Teesport. At present 'supplies had to be brought overland from other ports. From Teesport it would be possible to provide bunkering facilities more conveniently for the greater volume of shipping using the Tees.

The reason for the new facilities was that steel and other industries in the area were calling insistently for greater supplies of oil fuel. Throughout the whole steel industry the drive for higher productivity had led manufacturers to rely increasingly on oil fuel.

After referring to the plan to give easier access to the Tees by bigger ships, Mr. Brunner said that much preliminary work had been done and the first stage completed in the development of what was virtually a new port on the Tees.

Petrochemicals Future

SIR ROBERT RENWICK, who closed his association with Petrochemicals, Ltd., at the annual meeting in London on March 27, expressed in his final address his appreciation of the economies in working that had been obtained.

Real progress, he said, had been made in the last 12 months, operation savings at the rate of over £500,000 a year having been obtained. There was no other petroleum chemical plant in Europe today which lent itself better to further development.

He regretted that on present reduced throughput, profitability was seriously affected but reiterated his conviction that by intensive sales activity and by widening the range of end-products, that problem could be solved.

Taw and Torridge Festival

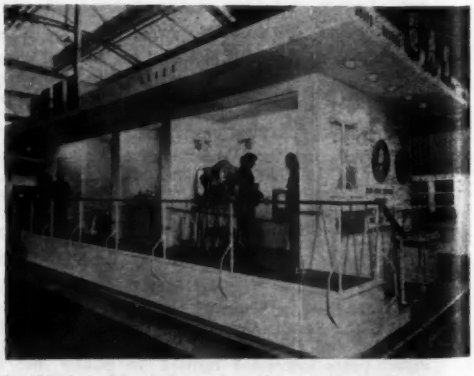
IN THE DISTRICT covered by the North Devon Sub-Division of the South Western Gas Board, local organisers have decided in connection with the Coronation to hold a Festival of Arts for the period July 11 to 19.

It was thought that local hoteliers, boarding house proprietors and the like would appreciate a course on catering to stimulate interest in food, and to give ideas for catering for American and Continental visitors who might be visiting the district for the Festival.

The North Devon Sub-Division of the Board co-operated with the organisers and made available the Board's demonstration theatres at Bideford and Barnstaple. The demonstrations were given by Miss Rosemary Hume, Head of the Cordon Bleu Cookery School, London, assisted by Miss D. Card, Home Service Adviser of the North Devon Sub-Division.

BRIGHTER HOMES EXHIBITION

MORE THAN 9,000 housewives watched hourly cookery demonstrations by the North Western Gas Board's home service advisers in a demonstration theatre which formed part of the Board's exhibit at the 20th annual Brighter Homes Exhibition held in the City Hall, Manchester, from March 10 to 28. The theatre, with accommodation for 60 people, was packed to capacity throughout its eight-shows-a-day run.



The theatre was additional to the Board's main exhibit, which was a stand designed to show how gas plays its part in home and factory. During the 18 days of the exhibition, the stand attracted some 10,000 visitors and 300 firm enquiries were received. Our accompanying photograph shows a section of the stand set up as a modern gas equipped bedroom.

Gas in the Potteries

LAST week, on the occasion of a Press visit organised by the Gas Council Press and Information Office, in conjunction with the West Midlands Gas Board, we were able to see at first hand the very great progress which has been made in the use of gas in the Potteries. Mr. H. F. H. Jones, Deputy Chairman of the Gas Council, was present, and a welcome was extended by Mr. G. le B. Diamond, Chairman of the West Midlands Gas Board. Tours were conducted over eight works representative of the varied activities of the pottery industry, and the whole event was both fascinating and in the nature of a revelation.

The amount of gas used in the firing of pottery at works in the Stoke-on-Trent district has increased four-fold since the end of the war and in 1952 totalled over 4,760 mill. cu.ft. From the manufacturers' point of view, the saving in labour and fuel costs, and the decrease in the percentage of rejects, by using gas with its constant quality and automatic control explain why there has been such a rapid increase in its use.

Fuel Economy

The effect on national fuel supplies is also important in that, in the average gas-fired oven, one therm of gas does the work of four therms of coal, and in some cases this efficiency is considerably higher. In effect the adoption of gas-fired continuous ovens from a national point of view is equivalent to saving two-thirds of the coal required for firing. The advantages to the workers following the use of gas with its inherent cleanliness are apparent, and the factories we visited were examples of changed environmental conditions for those employed—to say nothing of smoke abatement in the surrounding district.

The first gas-fired kiln was installed in 1932; by 1952, 229 gas-fired kilns were in use, and the number is increasing. In addition, the use of town gas for ancillary purposes such as clay drying, drying of articles after shaping, glaze drying, frit melting for the manufacture of glazes, bone calcination, printing, etc., has brought about a greatly increased demand for town gas. The story is in fact quite spectacular. The adoption of these new methods is leading to the elimination of the traditional 'bottle' kiln intermittently fired by raw coal which has been in existence since the birth of the pottery industry.

Improved Atmosphere

Improvements have from time to time been made in the design of the 'bottle' oven, but no major economy in fuel consumption has been achieved. As we were told during our tour by many of the most prominent pottery manufacturers, this method of intermittent firing lacks all the basic principles of heat conservation and it is impossible to avoid heavy heat losses during the cooling of the ware, in the seggars for protecting the goods, and in the massive brick structure of the oven itself. As the once familiar sight of these 'bottle' ovens disappears from the landscape of the potteries, there is a noticeable improvement in the atmosphere, a keener look in the eye of the manufacturer, a pleasanter expression on the faces of the 'workers.' For there are many advantages of continuous firing by gas. They include the production of better ware, improved control of firing processes, better working conditions—as we have mentioned—and reduced expenditure on seggars and continuous output of goods.

Mr. H. F. H. Jones, M.B.E., Deputy Chairman of the Gas Council; Mr. Alex. W. Lee, Deputy Chairman, and Mr. G. le B. Diamond, C.B.E., Chairman, West Midlands Gas Board; and Mr. J. E. Stanier, O.B.E., G.M., General Manager, North Staffordshire Division, West Midlands Gas Board.

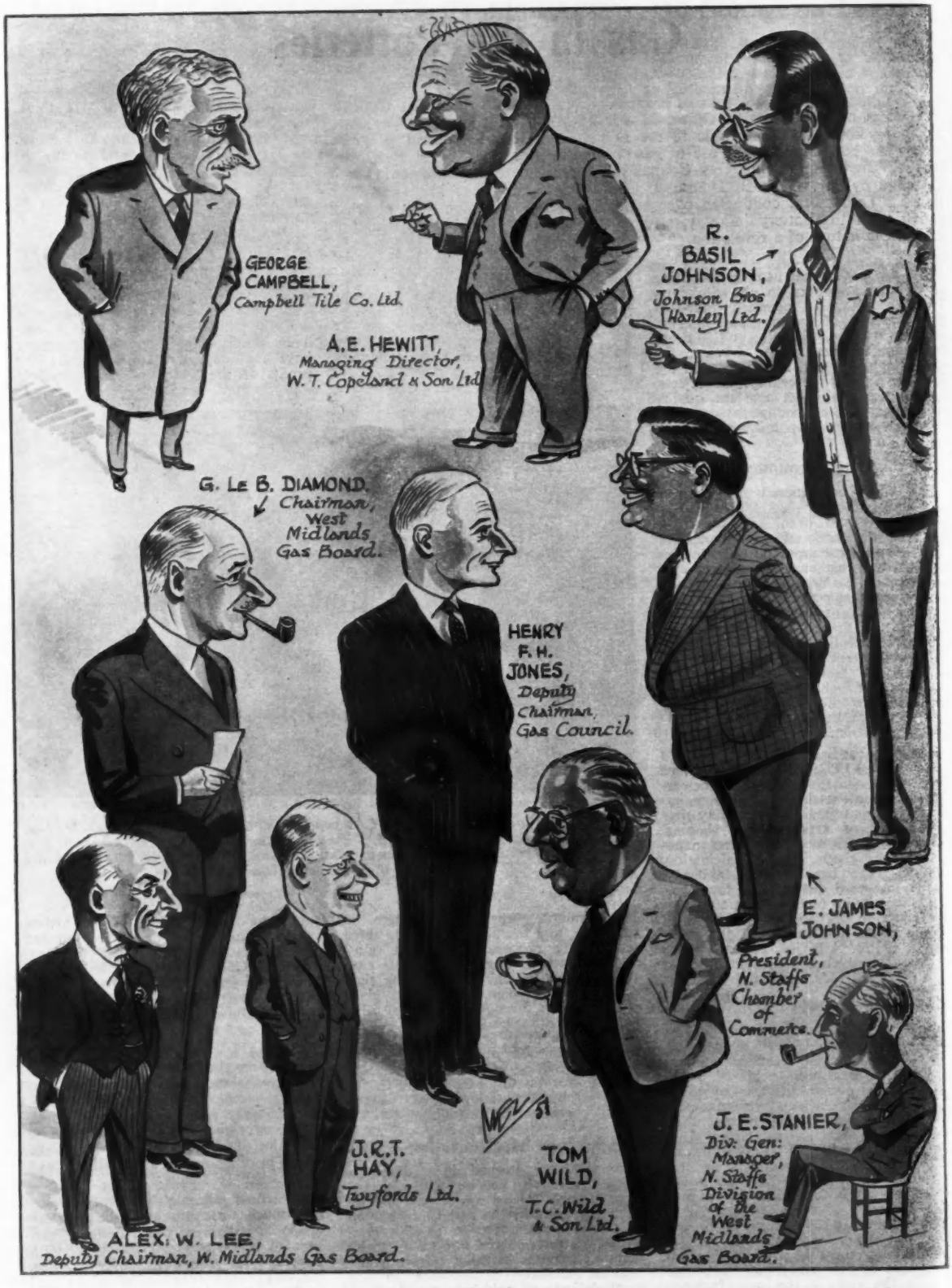
Continuous ovens vary in length up to 400 ft. and are adapted for the three main firing processes of biscuit, glost and decorating. The firing process converts the plastic clay into a strong rigid body which is then dipped into glaze and passed through the glost-firing stage. After decoration has been applied, the third firing takes place to give the finished product. The temperature of firing varies between 1,250°-1,250°C. for biscuit; 1,020°-1,150°C. for glost, while decorating kilns usually operate between 700°-750°C.

More Mechanisation

An industry steeped in tradition is being evolved in keeping with changed circumstances by the use of gas, and we were impressed by the enthusiasm shown in this evolution by those who conducted us through the various factories manufacturing anything from the heaviest sanitary earthenware to the most delicate of gold-bespattered china. We think that there could be much less employment of labour, which, of course, means more mechanisation. We think, too, that some of the designs printed and subsequently glazed into 1953 Stoke-on-Trent ware are fussy and, to say the least, very vulgar. The craftsmanship, the skill, the raw materials, the experience, and, we suppose, a knowledge of the markets—all are there. Would it be impossible, we ask ourselves, to satisfy mass palate without such excessive crudity of design? Other countries have their methods of producing pottery and they also have their artists. Town gas alone will not capture the world's pottery market for Stoke-on-Trent. It is helping enormously, as we have indicated, but fundamentally the profits of the Stoke-on-Trent manufacturers lie in the hands of the artists, whose palms should be suitably treated by the executives responsible for production. One of our major impressions as a result of this interesting and educative visit last week to the Potteries is that these executives are aware of the situation and fully alive to world competition.

May we make the suggestion that, while they keep their fingers on the pulse of current public taste in pottery design, manufacture, and embellishment, both in this country and abroad, they should also aim to educate and enliven public taste—in other words, artistically to lead rather than to follow.

As a final note we should like to say how much we appreciated the courtesy of the executives of world famous firms situated in Stoke-on-Trent area who showed us round their factories, explained their production aims, and made us feel that the pottery industry of Great Britain is one of our great national assets.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J.R.T. HAY, Twyfords Ltd.
TOM WILD, T.C. Wild & Son Ltd.
J.E. STANIER, Div. Gen. Manager, N. Staffs Division of the West Midlands Gas Board.
ALEX. W. LEE, Deputy Chairman, W. Midlands Gas Board.
MEL 51

Personalities present on the occasion of the visit to the Potteries last week—see previous page—as seen by 'Mel.'

MAIDEN VOYAGE OF NEW COLLIER

Mr. F. M. Birks on the bridge.

THE North Thames Gas Board's latest addition to its up-river collier fleet, the m.v. *Falconer Birks*, completed her maiden voyage last week from a north-east port, carrying 2,600 tons of coal for the Board's Nine Elms works.

Launched last November at Grangemouth, the *Falconer Birks* is the first of seven colliers, ordered by the Board in 1951, to go into service and brings the total carrying capacity of the Board's fleet of 25 colliers to nearly 70,000 tons. More than 70% of the Board's total coal requirements is sea-borne. A great deal of attention has been given to the provision of the best possible living and working conditions for the crew. Separate single-berth cabins have been provided for every member of the crew. Hydraulic deck machinery and the latest navigational aids (such as Radar, Decca navigators and echo sounders) have been incorporated in the vessel's equipment. Powered by an eight-cylinder Clark Sulzer marine diesel engine, the vessel has a speed of approximately 11 knots and being of the 'flat-iron' type is capable of passing under all the Thames bridges as far up-river as Fulham.

The *Falconer Birks* has been selected to represent the gas industry's colliers at the Coronation Naval Review off Spithead next June.

An Advisory Leaflet

AN advisory leaflet, No. 31 ('Installing Solid Fuel Appliances, No. 2: Heating Stoves, Independent Boilers and Cookers.' Stationery Office, 3d.), the second of two prepared by the Ministry of Works about the installation of recommended solid fuel appliances, is now on sale. It deals with precautions to be taken when fixing heating stoves, independent boilers and cookers, the appliances being grouped into 'free standing' (which do not need to be built into a recess), and 'inset' (fireplace opening to be provided).

Advice is given on how to fix a register plate across the fireplace opening or chimney to enable the flue connection to be sealed, and on the provision of facilities for flue cleaning if the chimney cannot be swept through the appliance. Methods of fixing openable stoves, free standing cookers and independent boilers, and combination grates, are described in practical language for the man on the job, with diagrammatic explanations. Stress is laid on the importance of sealing against air leaks.

Copies of the leaflet and of No. 30 (the 'No. 1' on the subject which deals with open fires) and of previous advisory leaflets are obtainable, singly or in bulk, from the Stationery Office or through booksellers, at 25 copies for 3s. 6d., 50 for 6s. 6d., 100 for 12s. 6d., 1,000 for £5, including postage. Postage on quantities less than 25: up to four copies, 1½d.; up to 14 copies, 2d.; over 14 copies, 3d.

Gas Cookers for Ludlow Council Houses

LUDLOW Rural Council, faced at a recent meeting with what was described as 'a pistol put to their heads' by the electricity authority in the matter of choice of cookers, gas or electricity, for council houses, decided not to be dictated to and chose gas cookers.

It had been reported by the council's engineer that the cost of providing a gas cooker and wash boiler in each of the 22 houses on a site at Craven Arms was £26 2s. 9d. and for the same operations by electricity £26 0s. 3d. If the gas installation were agreed upon, however, said the engineer, the electricity authority would require a capital contribution of £100 towards the cost of lighting to justify the cost of providing the service.

Some members suggested that the Council should fight the matter out with the electricity board. It was held that the Council should not be dictated to. The gas board did not insist on a contribution. One member said that the electricity board would no doubt get their revenue back from power points in the houses for electric irons, kettles, fires and other appliances. It was also noted that the electricity authority were 'continually raising their charges.' The engineer said he thought gas would be better than electricity as one obtained immediate heat from gas, whereas electric cookers took time to warm up. It was decided to have electricity light and gas cookers.

Unsolicited Testimonial

'THE MANAGEMENT wish to thank patrons for their kind support during heating breakdown and to assure them that we can now guarantee warmth from a completely new installation of latest design by the Wales Gas Board.' This was the wording of a poster recently displayed outside the Tivoli Cinema, Gowerton.

This cinema was fitted with an installation of electric tubular-type heating, which the management considered unsatisfactory, and to which they attributed their loss of patronage during the cold weather in mid-winter. The Wales Gas Board (Llanelly and Gowerton undertakings) were called in, and a scheme was put forward for heating by overhead stylised gas panels along the inside of all the outer walls. The new installation has proved most satisfactory, and the poster displayed was in no way inspired by the Board.

The Annual Dinner of the Ludlow, Craven Arms and Church Stretton districts of the West Midlands Gas Board was held at Ludlow on March 27. The president, Mr. W. J. Tipping, proposed 'The West Midland Gas Board' and Mr. C. M. D. Belton, Shrewsbury, responded. Mr. Belton presented clocks to Messrs. F. Devlin, of Craven Arms, and Mr. C. Wontner, of Ludlow, who have completed 25 years' service with the Board. Enamelled silver spoons were presented to Messrs. G. Hart, R. Jacks, and J. Sargent for proficiency in first aid.

Babcock and Wilcox Film Show

AT a meeting of the Scottish Junior Gas Association (Western District) in the Royal Technical College, Glasgow, on March 27, three films were shown which had been loaned through the courtesy of Babcock & Wilcox, Ltd.

The first film, entitled 'Steam,' was a sound film illustrating the principles embodied in water-tube boiler design and operation, together with details of construction and manufacture. The title 'Steam' was originally used for the silent film which the firm made in 1924. In the latest film they have adopted the same title but the scope covered is much greater and includes the many developments in process and production which have occurred in the last 20 years. An explanatory commentary with musical background enhances its interest.

'Seamless Tube Making' was next shown and provided a fascinating study of boiler tube fabrication and their production by the rolling mill and Pilger mill processes, also the reduction of tubes to smaller diameters on the drawbench and reducing mill.

The third film shown was entitled 'Foundry Practice.' In this film the basic processes of pattern making, moulding, core making, and casting are described, including the variations of these processes for hand and machine methods, the latter being demonstrated in a modern, mechanised foundry.

At the conclusion of the meeting, Mr. R. A. Currie, President of the Association, expressed his appreciation and gratitude to Babcock & Wilcox, Ltd., for their kindness in supplying the films.

'CUT-THROAT' COMPETITION

AN attempt by the Midlands Electricity Board to cut out gas service on a Staffordshire housing estate is being challenged by the local council. The board offered to move free of charge two pylons and an underground cable to supply a Stone Rural Council housing site on condition that houses to be built there were not fitted for gas. The board, which also offered to lay on the electricity service to the estate free of charge on the same conditions, demanded that the houses should be provided with electric wash boilers and points for cookers.

The council's housing committee at first accepted the offer, rejecting the gas board's counter-offer to meet part of the cost of laying gas pipes; but now the council has referred the matter back. It was stated that it was not fair to force tenants to have electricity, and a gas spokesman condemned the M.E.B. for 'not playing the game.' 'There is usually a sort of gentleman's agreement about this sort of thing,' the official declared, 'and the M.E.B.'s action is not quite cricket. The two bodies are certainly in competition, but it's healthy competition.'

The electricity board vice-chairman, Mr. D. H. Kendon, admitted that moving cables and pylons was an expensive business. 'We are very keen to get all the business we can and we always compete with the gas board,' he said. 'Competition is good for both of us, but it is fair competition. We don't undercut them. It is rare to have to move pylons, so I can't say if we would normally do it free or not. In providing new services, we weigh up the amount of business we are likely to get, and by that decide whether we should make a charge to the local council or not.'

Stone's housing committee chairman said that they accepted the electricity board's offer on principle because it meant building the houses a good deal more cheaply and so being able to knock something off the rents. 'What we shall decide eventually I don't know,' he added, 'but we certainly get a little quiet amusement out of seeing these two nationalised bodies in cut-throat competition. It does seem foolish that there should be this backbiting, but it suits us very well.'

Mr. J. H. Gibbons, of R. & A. Main, Ltd., has just completed an extensive series of lectures on the Main No. 20 Century cooker. His tour included visits to the South Western area, where three talks were given to district personnel at Bath and Bristol; the West Midlands, where lectures were given to the discussion group at Birmingham, and to the district personnel at Rugby; and two talks to the district personnel of the Southern Gas Board at Bournemouth.

Sources of Information

THE Association of British Chemical Manufacturers has just issued a book entitled *Press Guide to British Chemicals and Their Manufacturers.* This is the first book of its kind and has been prepared expressly to assist journalists, broadcasters, lecturers, and others who may be writing or speaking on chemical subjects and who need quick references to sources of reliable information.

The book is based on an alphabetical list of chemical products or fields of work considered likely to be the subject of inquiries by workers in these professions. A simple numerical code identifies the companies likely to be able to provide authoritative information, and the name and telephone number of the official authorised to answer inquiries is given to provide a positive contact and obviate delay. In cases of doubt or difficulty the Association's officials (Regent 4126 and 1557) will do their best to direct inquiries into proper channels.

If the booklet proves helpful, as it assuredly will, revised editions will be issued and suggestions for improvements or additional subject headings will be welcomed. Some 2,000 copies of the booklet are being distributed in the first instance to the national, provincial and technical Press, monthly journals, etc., in connection with which inquiries involving chemicals may be expected to arise.

YORKSHIRE JUNIORS AT COPPER PIPE WORKS

As reported in our issue of April 8 (p. 88), the members of the Yorkshire Junior Gas Association on March 18 visited the Yorkshire Copper Works, Ltd., on the occasion of President's Day. Here Mr. C. G. Broome, President of the Association (wearing the Presidential jewel) is seen with a group inspecting large diameter copper pipes.

Six Employees at the Coxside, Plymouth, manufacturing station of the South Western Gas Board retired at the end of March after a total of 210 years' service with the undertaking, and their retirement was marked by presentations made by the Station Engineer, Mr. L. P. Price, S. Wakefield (29½ years), A. G. Barrett (29½ years), F. Blackett (33¼ years) and W. H. Hodge (33½ years) each received cheques and C. Teague (34 years) and R. W. Bassett (50½ years) canteens of cutlery.

INSTITUTION OF GAS ENGINEERS

Wales and Mon. Section Re-Visits Llandudno

FOR its third Spring Meeting on April 16 and 17 the Wales and Monmouthshire Section of the Institution of Gas Engineers, founded originally as the Wales and Monmouthshire Association of Gas Engineers and Managers in 1905, re-visited Llandudno, where the first Spring Meeting was held two years ago. The Chairman of the Section, Mr. H. Maycock, Engineer, Manager, and Secretary of the Holywell-Flint and Ruthin undertakings of the Wales Gas Board, presided over the usual good attendance, and the only disappointment in a full social and technical programme was the cancellation, owing to the rainy weather, of the bowls competition for the Holmes Hunt rose bowl. The President of the Institution, Mr. G. E. Currier, O.B.E., and the Secretary, Dr. W. T. K. Braunholtz, O.B.E., were present, together with Mr. E. C. Woodall, member of the Eastern Gas Board, and Mr. F. T. Brookes, General Manager of the Tottenham Division, formerly Chairman and Secretary respectively of the British Gas Light Company which owned the undertakings under Mr. Maycock's management, and Mr. J. W. Denton, O.M., Chairman of the South Western Section of the Institution. The business sessions were held in the Town Hall and the social events at the Hydro Hotel.

Councillor HUGH OWEN, J.P., Chairman of the Llandudno Urban District Council, gave the members a cordial civic welcome at the opening of the business session, a 'Welsh welcome to a Welsh town and queen of watering places,' which was suitably acknowledged by Mr. Maycock.

Mr. J. POWDRILL, M.B.E., Hon. Secretary, reported apologies for absence from Mr. R. S. Snelling, Deputy Chairman of the Wales Gas Board, Mr. E. M. Edwards, member of the Board, Mr. K. L. Stock, Under-Secretary, Gas Division, Ministry of Fuel and Power, Major C. G. Hyde, Mr. J. W. Davies, Mr. A. G. Higgins, Assistant Secretary of the Institution, and Dr. A. B. Badger, Industrial Relations Officer, Gas Council.

The CHAIRMAN welcomed the President and Secretary of the Institution and a number of guests from London and the provinces.

On the proposition of the CHAIRMAN, seconded by Mr. S. L. WRIGHT, Mr. E. M. Edwards, Mr. O. P. Cronshaw, and Mr. J. Powdrill were appointed Trustees of the Section funds.

The meeting unanimously confirmed the election to membership of the Section of Mr. H. Buckley (Pontypool) and Mr. E. J. Spurrier (London).

Certificates were presented by the Chairman to successful Wales students in the Institution and other examinations.

Mr. MAYCOCK then presented his Chairman's Address, an abstract of which appears on pp. 221-224.

Mr. O. P. CRONSHAW (Rhyl) proposed a vote of thanks to Mr. Maycock who, he said, had had experience in serving the gas industry both in the south and north and had been able to give an account of his work at Abertillery and at Holywell. He had not mentioned the latest development at Holywell, where arrangements had been made to supply gas to Connah's Quay and to close the local works. They worked happily together in North Wales and he congratulated Mr. Maycock on his address.

The President and Secretary of the Institution of Gas Engineers with the Wales and Monmouthshire Section Management Committee. Front row: O. P. Cronshaw, H. Maycock (Chairman), G. E. Currier (President of the Institution), J. Powdrill (Secretary), K. E. Tiddy (Chairman-Elect). Middle row: S. L. Filer, Dr. W. T. K. Braunholtz (Secretary of the Institution), G. Fitton, H. Blythe, A. H. Dyer. Back row: A. Pickard, I. Thomas, Emlyn Jones, S. L. Wright, J. F. Rust.

Mr. J. F. RUST (Newport), in seconding, said he had known Mr. Maycock ever since he came to Abertillery in 1934. He had proved by his address that his colleagues were right in esteeming him as a live, competent, and enthusiastic gas engineer.

Mr. MAYCOCK, in reply, said his relations with fellow gas engineers had been of the happiest both in the south and the north, and he was glad to have the presence of both his predecessor and his successor at Abertillery, Mr. Ivor Jenkins and Mr. D. S. Davies.

Mr. R. W. CROWTHER, Director of W. J. Jenkins & Co., Ltd., presented a paper on 'Intermittent Vertical Chambers, Past, Present, and Future.' The paper and discussion will be reported in a later issue of the *Journal*.

On the proposition of Mr. H. BLYTHE (Colwyn Bay), seconded by Mr. E. ASPINALL (Halifax), a vote of thanks was accorded to Mr. Crowther for his paper.

The afternoon session was devoted to two papers which had been presented previously. Mr. L. J. CLARK (North Thames Gas Board) reviewed the paper on 'Steam and Power in the Gas Industry,' which he presented to the International Gas Congress at Brussels last year, and Mr. M. S. Gaskill (West's Gas Improvement Co., Ltd.) re-introduced the paper in 'Fuel Economy in the Gas Industry,' which he presented at the Tenby meeting of the Wales and Monmouthshire Section in May, 1952. Mr. Clark dealt so fully with questions which had been raised in previous discussions on his paper that he left no time or need for further discussion. Several members were anxious to raise questions on Mr. Gaskill's paper and the discussion continued until nearly an hour past the appointed time for closing the meeting.

Official Luncheon

The official luncheon was held at the Hydro Hotel on the Friday, with an attendance of nearly 200.

Mr. G. E. CURRIER, President of the Institution, in proposing the toast of the Wales and Monmouthshire Section, recalled that two Welshmen had been President of the Institution and expressed the hope that others would aspire to that office. The Institution had been greatly honoured in recent months by the fact that the Queen had become its Patron and the Duke of Edinburgh had accepted Hon. Life Membership. He thanked the members of the Section for their support on behalf of the Benevolent Fund. On the technical side he was glad to know that the Section was looking to experts for papers and adopting the practice of discussing reports and papers which had been presented elsewhere.

In going round the country he was impressed with the activities of the district sections, and with the support which the area boards were giving to the sections. The presence at the festive board of Mr. Mervyn Jones, Chairman of the Wales Gas Board, and Sir William Jones, a member of the Board, was evidence of the good relations that existed between them.

The CHAIRMAN, in reply, said if any testimony were needed of the progress of the Wales and Mon. Section it would be supplied in the observations and the complimentary manner in which Mr. Currier had proposed the toast and referred to the Section's activities, and in the heartiness with which the toast had been received. The Management Committee in arranging this meeting had concentrated on fuel conservation. The gas industry in Wales aimed at the highest efficiency in the interests of the consumers in order to sell the cheapest possible therms, by means of integration, butane/air plants, and a progressive sales policy. If they did not see anything spectacular in this coronation year they were at any rate striving to live up to their responsibilities. He thanked his North Wales colleagues—Mr. Cronshaw (in respect of the golf competitions), Mr. Blythe (hotel and meeting accommodation), and Mr. Wood (coach trip)—for their help in making the meeting a success. Mr. Powdrill, in taking over the duties of Secretary, had made the Chairman's office an easy one, and Mr. R. O. Roberts had looked well after the finances of the meeting. He greatly appreciated the presence of the President and Secretary of the Institution, the Chairman and Secretary of his former employees, the British Gas Light Company, Mr. H. J. Risby (Southport), an old Westminster Technical College colleague, Mr. S. L. Wright, Mr. Ivor Jenkins, and Mr. D. S. Davies.

Mr. E. ABLETT, O.B.E. (Swansea) proposed the toast of the prosperity of the town of Llandudno and referred particularly to the catering school which was making Llandudno famous in the hotel and catering world.

Councillor HUGH OWEN, J.P., Chairman of the Llandudno Urban District Council, replied and expressed the hope that the Section would come again.

Mr. K. E. TIDDY, Chairman-Elect of the Section, proposed the toast of the guests and said that having been in Wales for 18 years he was learning something of the hospitality of the Welsh people. Among the guests he mentioned Mr. Currier, Councillor Owen, Mr. E. C. Woodall, Chairman of the former Aberystwyth Gas Company as well as the British Gas Light Company, Mr. Brookes, Mr. Risby, Mr. L. J. Clark, Mr. R. W. Crowther, and Mr. M. S. Gaskill (authors of the three papers presented at the meeting), Mr. J. S. Smith (Ministry of Fuel and Power), and Dr. Braunholtz.

Mr. E. C. WOODALL, O.B.E., responded and said his visit was a sentimental one. It was the second time he had visited Llandudno; the first was 40 odd years ago when he came to visit a great uncle, Henry Woodall, a well known gas engineer and a great lover of Wales and of that town. The changes which were wrought in the gas industry in 1949 had prevented him from making his periodical journeys to visit the Holywell-Flint, Ruthin, and other gas undertakings in Wales with which he had been closely associated and which were situated in some of the most beautiful country in the British Isles.

The Social Side

The weather was disappointing, but both golf competitions arranged for the Thursday were played to a finish. The bowls competition for the Holmes Hunt rose bowl, however, had to be cancellled because the rain had rendered the green unplayable. The golf competitions were played over the Maes Du municipal course. In the 18-hole competition the Upjohn Cup was won by A. Pickard (Llanelly), Immediate Past Chairman of the Section. He tied with W. K. Parsons with a score of 75 and was declared winner by virtue of the best score over the second nine holes. In the Dean Cup Stableford competition the best best scores were returned by Darrell W. Rees, Pembroke, 34, T. Mervyn Jones, Chairman, Wales Gas Board, 29; and J. P. Smith, Manchester, 27. The trophies were presented to the winners by Mrs. H. Maycock at a dance held at the Hydro Hotel on the Thursday evening.

For the annual coach outing Mr. J. Wood had planned a visit to the famous Bodnant Gardens, but the heavy rain necessitated a change in the programme. Members instead went on the well-known Alpine tour through the Conway Valley, Waterloo Bridge, Conway Falls, Pentrevoelas, the Nebo Heights, Llarnrwst, Gywdyr Castle and Trefriw Spa. Tea was served at the Ty Gwyn Hotel. Ro Wen.

The programme ended on the Friday evening with a showing of the latest Gas Council films under the direction of Mr. Reginald J. Gregg, Publicity Officer, in the ballroom of the Hydro Hotel.

Combustion Engineering Association

THE annual conference of the Combustion Egineering Association will be held at the Palace Hotel, Buxton, on May 7 and 8 under the Presidency of Mr. B. E. A. Vigers, of Laporte Chemicals, Ltd. Following a civic welcome by the Mayor of Buxton, Mr. R. J. Moffat, M.B.E., Deputy Director of Marketing, National Coal Board, will read a paper on 'The Advantages and Disadvantages to the user of Delivered Prices for Coal.' The first afternoon session, presided over by Mr. H. E. Pearsall, of John Thompson (Triumpth Stoker), Ltd., will hear a paper by Mr. H. E. Partridge, of Partridge, Earp, & Partners, on 'Improving the Efficiency of Existing Boiler Plants.'

On the Friday morning Mr. W. C. Carter, of John Thompson (Water Tube Boilers), Ltd., will read a paper on 'The Relative Merits and Applications of Different Methods of Firing Water Tube Boilers with Solid Fuel and the Effect on Rating of the use of Low Grade Fuels.' The session will be presided over by Mr. H. C. Hawkins, of BX Plastics, Ltd.

The Chairman on the Friday afternoon will be Brigadier K. Hargreaves, M.B.E., and at that session Mr. A. Kenyon, of Shell Mex & B.P., Ltd., will read a paper on 'Oil as a Main and Supplementary Fuel for Firing.'

IN PARLIAMENT

Nationalised Industries

MEMBERS of Parliament are still showing concern at the comparatively small amount of control the Government has over the nationalised industries and the difficulty in getting up-to-date information about them. This anxiety was shown by two recent Questions in the House.

Mr. GERALD NABARRO (Kidderminster) asked the Chancellor of the Exchequer whether, in view of the success of the Comptroller and Auditor General of the Exchequer and Audit Department, illustrated particularly by recent reports, he would take steps, by legislation or otherwise, to appoint a similar auditor, scrutineer and general investigator to exercise surveillance in the affairs of the nationalised industries with the object of checking financial indiscretions and excesses and economising moneys which would otherwise have to be paid by consumers.

Mr. JOHN BOYD-CARPENTER (Financial Secretary to the Treasury) rejected the suggestion, observing that adequate powers of investigation of this nature could not be conferred except as part of a complete recasting of the statutory relationship of the nationalised industries to Ministers and Parliament. Her Majesty's Government had no proposals to make on this at the present time.

The other Question came from Major S. F. MARKHAM (Buckingham), who asked the Prime Minister whether, in view of the difficulties in the way of Members of Parliament obtaining up-to-date information about the nationalised industries of this country, he would cause enquiries to be made as to whether meetings could be arranged in Parliament on a non-party basis at which those in control of nationalised undertakings could explain the present state of those industries and answer questions.

Mr. WINSTON CHURCHILL said he assumed this was one of the matters to which the Select Committee on nationalised industries would direct its attention, and perhaps his hon. and gallant Friend and he might both await its recommendations.

In the Bratt Colbran advertisement on p. 127 of the *Journal* for April 15 we regret that their stand number at the B.I.F., Birmingham, was given incorrectly. It should be No. D656.

The Directors of the Engineering Centre, Ltd., have resolved to close the Centre on September 30. Certain industries, trade associations, and large manufacturers have shown preference for arranging their own exhibition of their products and the tendency is for these organisations to select areas of their own choice for such exhibitions. The directors have little doubt that when these new sectional enterprises become firmly established it would be impossible to carry on the existing Engineering Centre as a permanent exhibition truly representative of the engineering industry as a whole.

Physical Society Exhibition

THE 37th exhibition of the Physical Society, held on April 13, 14 and 17 at Imperial College, South Kensington, maintained its usual high standard of scientific progress. In the following notes we draw attention to some of the exhibits.

The **British Thomson-Houston Co., Ltd.,** offered a particularly wide variety of exhibits, some of them from the B.T.H. Research Laboratory. One interesting device which was demonstrated on the stand was a Multichannel carrier telemetering and control system.

The increasing interconnection of gas producing and consuming installations has led to a demand for telemetering systems, capable of transmitting a large number of instrument indications over a single pair of wires. The equipment displayed was capable of transmitting up to 30 separate indications over a single line, and also included facilities for remote operation of apparatus such as gas valves.

Audio-frequency transmission in the frequency range 300-3,000 c/s, with pulse-length modulation, was used. For those applications where the rate of information was low, provision was made for greatly increasing the capacity of the system by time-sharing.

The apparatus shown comprised a 30 channel transmission line, and a 30 channel filtering and amplifier unit arranged to transmit pressure information over one channel, the remaining 29 channels being occupied by simulated signals.

Within the group of research bodies on the stand of the Department of Scientific and Industrial Research, the **Fuel Research Station** exhibited a range extending device for a recording potentiometer, an electromagnetic recording torquemeter for viscosity measurements, and an interesting temperature cycle controller.

Temperature Cycle Controller

The last-named, which was demonstrated, operated from the ordinary impulse clock system and consisted essentially of a group of selector switches such as are commonly used in telecommunication. They were actuated by the clock impulse and each was arranged to have a rotation time which was a different multiple of the unit pulse time. The selectors transferred a connection from the bridge network of a normal adjustable-setting temperature controller to tappings on a resistance and thus altered the controller setting at predetermined times. The settings of more than one controller could be adjusted at one time and independently one of another. There was also a wide freedom of choice of the individual timings and complete cycle times and consequently of the form of the controlled temperature cycle.

Exhibiting a number of devices made in the past few years for special and research applications, including some of the apparatus made during the war years for defence purposes, the **Cambridge Instrument Co., Ltd.,** provided a number of items which have not been exhibited hitherto for reasons of security. However, none of these were of any direct interest to the gas industry and we do not propose to describe them in these columns.

Dawe Instruments, Ltd., on a stand which contained a number of interesting exhibits, included the type 2006 multipoint inflammable gas monitor. Designed primarily for use on oil tankers, it was felt that this equipment should prove useful in checking other locations such as underground chambers including gas mains.

The method used employed a pair of hot catalytic platinum filaments in a Wheatstone bridge circuit. Motor-driven cam-operated contacts connected the bridge circuit of each test point to the power supply and detector in sequence. Thus, for an equipment having five bridge circuits, each pair of elements was energised for only half a second of the complete cycle of fifteen seconds. This feature increased the useful life of the filaments compared with continuous operation. A small amount of inflammable gas, well below the explosive limit, produced an unbalance in the corresponding bridge circuit which was sufficient to operate the gas alarm. The equipment was to some extent self-checking, in that a faulty element at any test point gives a fault alarm signal.

Interesting New Instruments Reviewed

W. Edwards & Co. (London), Ltd., showed a wide range of vacuum pumps, gauges and special plant, some of which were of particular interest to the gas industry. For example, we noted the high backing pressure mercury diffusion pump and plastic water jet pump, a four stage pump capable of working a high speed against very high backing pressures with moderate heater input (75 litres/sec. with a limiting backing pressure of 35 mm. of mercury at an input of 850 watts). This was demonstrated and backed by a newly designed plastic water jet pump which incorporated a ball valve so that there was no 'suck back' of water into the vacuum if the water supply failed. Also, recently developed air-cooled versions of the Speedivac 102 and 203 oil diffusion pumps were demonstrated, and other exhibits included a V.S.4 hot wire vacuum switch and a fire control needle valve.

Instruments shown by **Elliott Brothers (London), Ltd.,** included strain measuring equipment, a brine density meter, miniature circuit techniques, magnetic amplifiers, standard transductors, a low level D.C. magnetic amplifier, such precision electrical measuring instruments as a reflecting dynamometer voltmeter, and laboratory standard instruments, and several examples of computing equipment.

Evershed and Vignoles, Ltd., included on their stand a special high voltage mains operated 'Megger' insulation tester, examples of recorders, and a selection of Servo and other fractional horse power motors. A selection of these power motors for d.c. and a.c. was exhibited. Those for use with servo mechanisms had a high torque/inertia ratio. Some of the motors included generators for providing a damping component proportional to speed so as to increase stability and avoid hunting. The generators in the d.c. machines were of the permanent magnet type giving the minimum of ripple, whilst on the a.c. machines they were of the drag-cup type having therefore minimum inertia. One of the d.c. motors exhibited incorporated a secondary motor and fan to provide forced cooling. There are also constant speed d.c. motors of the governed type and synchronous a.c. motors.

In measuring steam purity by the electrical conductivity method, the presence of dissolved gases such as ammonia, carbon dioxide and hydrogen sulphide may increase the conductivity to many times that due to the dissolved inorganic salts and so entirely mask the effect of the latter.

The Evershed-Straub degassing condenser, which was also shown, removes these gases so that a gas-free sample may be used for conductivity determination by the 'Dionic' water purity meter.

Humidity Recorder

Nash and Thompson, Ltd., exhibited eight pieces of apparatus, of which we particularly noted two—a recording hygrometer and a 'Holiday' detector. The former was designed to meet a specification calling for the recording of relative humidity and temperature inside a large closed container for a period of three months. The recordings had to be made hourly, or more frequently, the instrument had to work unattended and without external power supply, and it had to be unaffected by the normal motions of a ship. The solution arrived at was to photograph at hourly intervals dials indicators of humidity and temperature with a specially designed camera. The timing device, which operated the film-shift mechanism and the illumination for exposure, was a spring driven electrically maintained clock, and the record was taken on 35 mm. film. Power was derived from a 12 volt nickel-iron accumulator.

A 'Holiday,' in the sense in which it is used in the name of the instrument mentioned, is a pin-hole in the protective coating of a steel pipe-line. If such pin-holes are not detected and filled before the pipe is buried in the ground each is a possible source of corrosion.

The detector is manually traversed along the pipe on caterpillar tracks, whose rake is adjustable for pipes of diameters varying between 6 and 36 in. In front of the detector is a rolling spring electrode encircling the pipe and maintained at a high electrical potential. The resistance of sound coating is high enough to prevent any appreciable current passing, but when the electrode reaches a pin-hole a continuous spark passes to the pipe, throwing into circuit an alarm bell which continues to sound

until the fault is cleared and a reset knob is pressed. The spark also serves to burn out the hole, rendering it more visible for filling.

A particularly noteworthy range of exhibits was assembled by the **National Coal Board** who went to the trouble of producing an effective little booklet specially for the occasion. Two pieces of apparatus of special interest to the gas industry were a device for the measurement of oxidation of fine coal and a moisture meter for the measurement of moisture in fine coal.

In the manufacture of smokeless briquettes from certain types of coal, it is necessary to reduce the caking power of the coal to prevent the briquettes sticking together in the coking oven. To achieve this, the coal is pretreated in an oxidation plant, and the function of the instrument shown was to determine the degree of oxidation, for plant control purposes. The method used was to measure the electric charge acquired by the coal particles as they impinged on a metal surface.

It was observed that when a small quantity of fine coal was allowed to slide down an inclined, earthed metal plate, and thence into a box connected to an electrometer, the coal acquired a measureable charge. With raw coal this charge was positive, and with strongly oxidised coal it was negative, intermediate degrees of oxidation giving intermediate values of charge. The effect was reproducible for coal of a given type, particle size range, and quantity.

In order to provide a continuous indication, the instrument must operate on a constant feed of coal. The electrification is then conveniently measured as a current, and a suitable d.c. amplifier is used instead of an electrometer. The charging device must be suitable for handling the flow of coal reliably. Coal from the hopper is fed at 15 gm/min. by a constant feed device into the charging device. The latter consists of a metal drum rotating at 3,000 r.p.m. inside a metal housing, and in passing it the coal makes a number of impacts on the drum and housing. The rotation of the drum produces a steady flow of air through the device which ensures the satisfactory intake and discharge of fine particles having very low free falling speeds. The charging device is insulated from earth by means of polished polystyrene bushes and the current flowing to it (of the order of 10^{-8} amp) is measured.

The d.c. amplifier is of a type in which the input current develops a voltage across a resistor of a few hundred megohms arranged in a negative feedback circuit. The voltage developed is large (1 to 10 V) and the troubles due to zero drift normally associated with d.c. amplifiers are thereby eliminated. Although the current to be measured is low, by normal engineering standards, there should be no difficulty in maintaining the required insulation, even under plant conditions, by the use of non-hygroscopic plastic insulators.

The other apparatus was developed to measure the free moisture present in fine coal. It operates by measuring the dielectric constant of the sample which, in the desired range, is found to vary substantially linearly with moisture content. Existing moisture meters are unsatisfactory for use with coal, since they give readings which depend critically on the large and variable conductivity effects arising from the presence of impurities of the coal sample and from variations in packing. It has been found that to ensure that these effects have negligible influence the measurements must be carried out at a frequency of at least 30 Mc/s. The coal is sampled by a capacitor of which two forms are demonstrated, one suitable for laboratory use, the other, in the form of a fringe field capacitor, is designed for use in continuous process plants where the sampling device must not obstruct the flow of coal.

Other exhibits of interest on this stand included a temperature sensitive relay for the protection of conveyor belt drives from overheating and a device for the estimation of respirable dust concentrations.

Manufacturers well known to the gas industry who were represented at the exhibition also included Cinema-Television Ltd., General Electric Co., Ltd., and Murex, Ltd.

COMPANY NEWS

A.C.E. MACHINERY, LTD.

The Directors of A.C.E. Machinery, Ltd., recommend a dividend of 20% for the year to September, 1952, the same as for the previous year. The net profit was £11,102 compared with £18,633, after tax of £16,256 against £27,754.

JAMES H. LAMONT

A trading profit for 1952 of £145,123, against £136,897, is reported by James H. Lamont & Co., Ltd. The net profit was £26,551 compared with £21,373; and £22,300 was transferred to reserve, against £7,300 for 1951. The ordinary dividend is 32½% compared with 25% and the carry-forward is £6,307 against £5,563.

ALBRIGHT & WILSON

Albright and Wilson, Ltd., announce a group net profit for 1952 of £631,177, compared with £920,563 for the previous year. Of the parent company's profit of £594,653 for 1952, £213,409 was earned by overseas subsidiaries, and of the total £151,639 has been retained by subsidiary companies. To the balance of £312,568 brought forward from 1951 by the parent company there has been added surplus on liquidation of a subsidiary company £44,031. The balance carried forward is £485,164. The year's dividend is maintained at 15%.

PARKINSON & COWAN

Parkinson and Cowan, Ltd., are maintaining the dividend of 7% on the ordinary capital for 1952, but no bonus is forthcoming on this occasion, against 2% for the previous year. Consolidated gross trading profit is £355,422 against £521,745). Group profit for the year after all charges, including £96,030 (£218,000) for tax, is £75,380 (£147,014).

BRITISH OXYGEN

In recommending a final dividend of 9% for 1952 the directors of the British Oxygen Co., Ltd., announce that group trading profits, before depreciation, have risen by approximately £1 mill. to £5,577,376. They state that the year's trading has been characterised by a satisfactory and sustained growth in sales which, coupled with new developments, has resulted in the improved total earnings. This total, 'stemming from a very wide range of products and processes,' was contributed by almost all units at home and overseas. The final now recommended is payable on the capital as increased to £8,117,698 by the 50% scrip issue in July and by the cash issue of £1,873,315 capital in December last. The shares issued for cash did not participate in the interim of 6%, so that the total dividend on £6,244,383 capital is 15%. For the previous year a total of 20% was paid on the then existing capital of £4,162,922.

ECONOMIC GAS BOILER

Ordinary dividend 20% for 1952 (same). Net profit, after tax £7,500 (£11,500), is £5,041 (£6,809). To general reserve nil (£2,500), forward £7,364 (£6,366).

LONDONDERRY

The Directors of the Londonderry Gaslight Company report that for the year ended December 31, 1952, the profit, after providing for estimated taxation on the year's results and transfers to the special purposes and renewal funds, was £4,354. Out of this have been paid or provided a year's interest on the debenture stock, £208; interest on 4½% mortgage loan for the period from October 17, 1952, to December 31, 1952, £421; and interim dividend for the year to December 31, 1952, on the consolidated ordinary stock at 2½%, less income tax, £1,184, leaving a balance of £2,541. To this the undivided balance brought forward from the previous year after payment of final dividend falls to be added, £27,551, making a total of £30,092. The Directors propose to pay a final dividend of 3% (making 5½% for the year), less income tax, which will absorb £1,420, and carry forward to next year £28,672. The Board, with much regret, have to report the death of Capt. J. T. E. Miller (Deputy Chairman), who served as a Director for the past 30 years. Mr. W. D. Smyth has been co-opted in his place.

THE BANFF FLOODS

HOW gasworks in the north of Scotland rallied to the aid of one of their number stricken in the January and February storms round the British coasts, was revealed by Mr. A. T. Morrison, Aberdeen, when he presided at a meeting of the Scottish Gas Consultative Council in Edinburgh on April 9. It was 'a wonderful example of co-operation,' he said. 'Full credit is deserved by all those concerned in this achievement for their hard and enthusiastic endeavour.'

Mr. Morrison reported that on the afternoon of Saturday, January 31, part of the gasworks at Banff were swept away by the high seas. The Deputy Divisional Controller, Mr. A. W. Brown, was instructed to take whatever steps he considered necessary to restore the gas supply. Mr. Brown, accompanied by two technical assistants from Aberdeen, was able to reach Banff the following morning after making several detours to avoid stretches of road closed by fallen trees.

By early afternoon on the Sunday Mr. Brown had discovered that suitable plant, comprising condenser, Livesey washer, and tower scrubber, was available at Blairgowrie. It was loaded by 6 p.m. and arrived at Banff in the early hours of Monday morning.

Fitters and mainlaying staff were sent from Aberdeen, Fraserburgh, and Peterhead to assist the Banff staff. Despite extremely bad weather conditions, work proceeded swiftly and by Monday, February 9, gas making had restarted. By the following day the supply was fully restored.

The damage to the gasworks was considerable. The whole of a protecting sea wall for a distance of 112 ft. was completely demolished, and this resulted in a strip of the works, approximately 30 ft. wide, being washed away. On this strip were accommodated the exhauster house, Livesey washer, and rotary scrubber, and the whole of this plant fell into the sea. The foundation of the atmospheric condenser was seriously undermined and this plant had to be pulled down. The underground cast iron tank of the smaller gasholder was exposed for about half the circumference. Some erosion below the foundation of the larger gasholder was also caused.

Fortunately a piece of ground on the landward side of the works was available, and on this was erected the annular condenser, Livesey washer, and tower scrubber from Blairgowrie. Adjoining this space is the existing compressor and meter house, part of which was used as a fitters' workshop, and in this space the two exhausters were installed. One of these exhausters was salvaged from the sea, while the other was one which had been lying in Aberdeen following overhaul.

New Projects

It was reported that £1,000-and-over projects approved by the Scottish Gas Board during the first quarter of this year totalled £541,483. The divisional figures were as follows: Edinburgh and South-East, £228,753 (including £104,368 for the provision of mains and services for housing schemes in Edinburgh; £78,367 for the laying of grid mains in the Falkirk district; and £30,900 for the installation of coke handling and storage plant at Galashiels); Central, £39,448 (for mains, services, and meters in Dunfermline housing schemes, £11,988; installation of coal and coke handling plant in the Kelty-Lochgelly district, £15,000); Northern, £7,573 (for the replacement of damaged sea wall at Banff); Glasgow, £185,298 (resetting bench of vertical retorts at Provan gasworks, £91,938; installation of two additional purifier boxes at Gartsherrie, £50,000; modernisation of the power gas water plant at Tradeston, £29,820); Lanarkshire and South-West, £80,411 (reconstruction of carbonising plant at Greenock, £25,655; reconstruction of carbonising plant at Renfrew, £35,000).

Scottish Price Standstill

SPEAKING at a luncheon at Auchtermuchty on April 9 to mark the linking of Strathmiglo with Auchtermuchty, Sir Andrew Clow, Chairman of the Scottish Gas Board, said the works at Auchtermuchty would henceforth produce gas for both places; Falkland has been similarly linked with Kingskettle.

It was no longer practicable to produce gas satisfactorily in a very small works. The costs were so disproportionate that in the years before nationalisation small works disappeared in various parts of Scotland: their owners could no longer afford to supply the gas. The Scottish Board continued to supply all the places it took over, but very few of the little ones paid their way, and many more would have been closed had they not received the support of the rest of Scotland, particularly of the big cities.

By linkages such as that now being celebrated they could bring the smaller works nearer a sound economic position, especially if they had the hearty co-operation of consumers. And a wider organisation enabled the Board to give better service. In the old days the manager of a larger place had not only more assistance on the spot, but he could get help from experts at a group headquarters. Thus these linkages should give better service for less cost.

As a result of the recent increase in the price of coal the Board would have to pay about £750,000 more a year, equivalent to 9d. to every pound it spent. With good coke sales, some of that expense could be saved, but most of it must remain; and the question naturally arose whether it should ask for a higher price for gas. The Scottish Board was anxious to avoid this if it was at all possible, and to do what it could by sound development and careful economy in the industry. Although it recognised that a big risk was involved, it had decided to impose no further increase at present. The question would be reviewed when it could examine the results of the financial year just ended.

Exhibition Results

IN OUR ISSUE of March 11 we described the stand of Cannon (Holdings), Ltd., at the Ideal Home Exhibition—an exhibit specially designed as a selling unit. Very great interest was displayed by the public and 11 salesmen were kept busy from beginning to end of the exhibition.

We learn from Cannon (Holdings), Ltd., that they are highly satisfied with the results of the co-ordinated efforts of their own and gas board salesmen who worked jointly on their stand. No fewer than 677 A125 cookers were sold and payments made, and 105,000 leaflets and folders were taken by the public. This latter publicity was not forced upon the public; the leaflets were taken from the stand during the demonstrations.

With orders taken at the exhibition and firm enquiries which have been passed on to the gas boards, it is estimated that the firm sold 1,100 A125 cookers. The interest evoked by the public has proved to the manufacturers and to the gas industry that the British public is still interested and will purchase high quality gas cookers.

NORTH THAMES SALESMEN AT MAINS

The first of eight visits to the Edmonton Works of R. & A. Main, Ltd., by sales and service representatives of the North Thames Gas Board was made recently by 40 members of the Northern Division. Our photograph, taken during the visit, includes, seated in the centre of the group, Mr. C. Marley, Joint Managing Director of R. & A. Main, Ltd., with Mr. W. J. Butler, Northern Divisional Manager, and Mr. N. A. Griffith-Jones, Commercial Assistant of the North Thames Board.

A MODERN COAL BLENDING PLANT

THE Fraser & Chalmers Engineering Works of the General Electric Co., Ltd., Erith, Kent, have supplied to the order of Simon Carves, Ltd., Cheadle Heath, Stockport, the coal blending plant for the coal carbonising section of the steelworks extensions of John Summers & Sons, Ltd., of Shotton, Flint. The plant, which has a handling capacity of 300 tons per hour, is the first plant in the world to utilise the Robins-Messiter system for coal blending.

The coal carbonising section presented the designers with a complex problem. A dozen or so different coals of widely varying coking characteristics had to be blended to ensure maintenance of the required coal specification for coke oven feed. In addition some of these coals, being prone to spontaneous combustion, could not be stored without danger for more than three weeks. Yet maintenance of an adequate supply at the site was an equally essential factor, especially when interruptions due to winter conditions and other factors might hold up rail deliveries.

Bedding and Blending

After the use of blending bunkers and normal coal storage facilities had been considered and rejected, it was decided to adopt the Robins-Messiter system of bedding and blending. This system was introduced to the United Kingdom by the Fraser & Chalmers Engineering Works of the G.E.C. in conjunction with their associates, Hewitt Robins, Inc., of the U.S.A. Originally developed for blending copper ores and, later, iron ores, it has been successfully employed before in England at the Southbank Ironworks of the Appleby-Frodingham Steel Co., Ltd., and later at the Corby Works of Stewarts & Lloyds, Ltd. Its use for coal blending is, however, a new departure. Four major considerations influenced the decision to install the plant at Shotton: accurate blending of large tonnages could be successfully obtained as the basic principle of the system is applicable to all bulk material; the space available would accommodate a sufficient number of piles for ample coal storage; the reclamation of the piles would recover all the coal and no 'dead' pockets would remain as a fire hazard; and, since the coal stored would be blended coal, and these coals liable to spontaneous combustion being mixed with coal not having such a characteristic, and coal piles would be reclaimed in rotation, the dangers of spontaneous combustion would be reduced to a minimum.

Fig. 1.—General view of the Fraser & Chalmers Coal Blending Plant at Shotton.

The Robins-Messiter system consists of two separate operations, (1) bedding the material, where a number of thin layers of coal are made into a pile, and (2) reclaiming, where each stroke of the reclaiming machine harrow removes and intimately mixes a true cross section of all the layers in the pile.

Bedding.—The beds are formed by the use of travelling wing trippers which automatically traverse the length of the

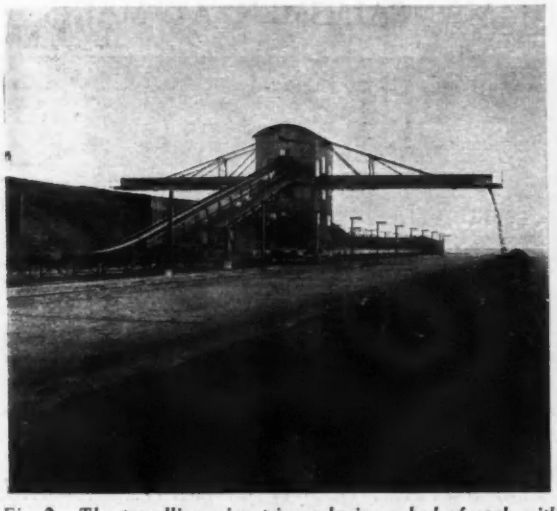


Fig. 2.—The travelling wing tripper laying a bed of coal, with the spare reclaimer in the background.

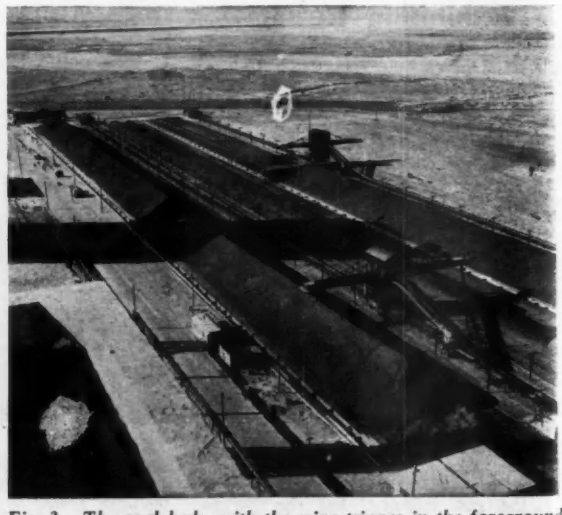


Fig. 3. The coal beds, with the wing tripper in the foreground and reclaimer upper centre.

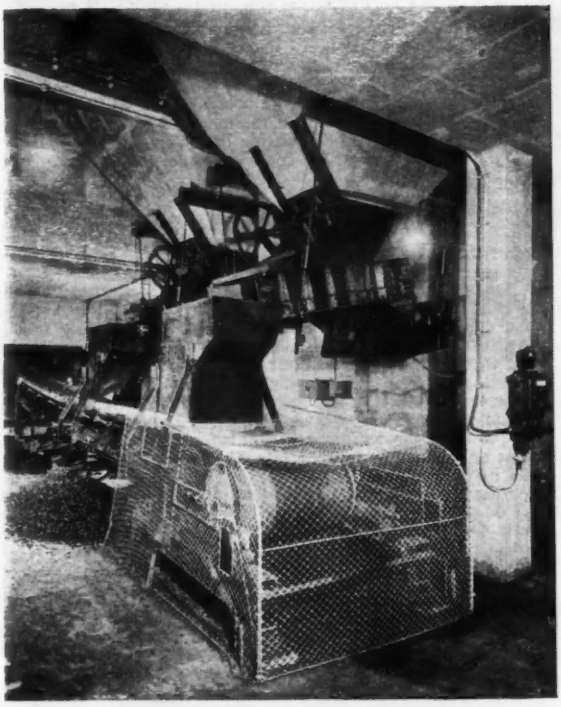


Fig. 4.—Fraser & Chalmers 'Sherwen' 40 in. × 7 ft. electro magnetic feeders.

bed depositing thin layers of coal one above the other from end to end of the pile. Accurate blending which requires approximately the same amount of coal in each layer is achieved by ensuring that the feed to the conveyor system is regular and that in the event of the feed being interrupted, the tripper is stopped immediately until supplies of coal are resumed.

The boom conveyor of the wing tripper is reversible so that when a pile has been completed on one side the conveyor may be reversed to make another pile on the other side of the machine.

Reclaiming.—Reclaiming of the piles is carried out by a machine which is a travelling bridge carrying the two essential reclaiming units, the harrow and the plough conveyor. The harrow is fitted to the front of the machine and reciprocates slowly across the face of the pile dislodging a small cross-section which, as it rolls down into the plough conveyor, is intimately mixed by hundreds of tines equally spaced over the harrow surface. The inclination of the harrow is adjusted to the angle which gives a steady flow of coal down to the conveyor. The plough conveyor then carries the blended coal to the side of the machine. This conveyor is reversible so that coal may be delivered at either side of the machine as required. When the machine has cleared one pile it is run back and by means of a transfer car is led to another track to deal with the next pile.

Present and Future Capacity

The plant installed at present is arranged for making three piles each of 12,000 tons capacity and 975 ft. long, a length far in excess of any previous installation. Equipment for a fourth pile is now on order and further space is available enabling a fifth pile of 12,000 tons capacity to be made and a sixth pile of lesser capacity, should such additional capacity be required. The whole of this operation of blending and reclaiming is carried out by only two men, one wing tripper operator and one reclaimer operator.

Three reclaiming conveyors only are provided, so that when equipment for the fourth pile has been installed there will be one down the outer edge of each outer pile and one running down the gap between the inner piles. Thus each outer pile is reclaimed through the centre conveyor by reversing the direction of the plough conveyor.

The equipment supplied for these operations includes two wing trippers, two reclaimers, a transfer car, and two Sherwen feeders supplied by the Fraser & Chalmers Engineering Works. All the belt conveyors and civil engineering equipment were designed and supplied by Simon Carves, Ltd., as part of their complete coke oven contract.

The 42 in. reversible travelling pile-bedding wing trippers are built up of mild steel framework, the tripper tower to be of sufficient strength to carry the load of the boom conveyor and trailing bridge.

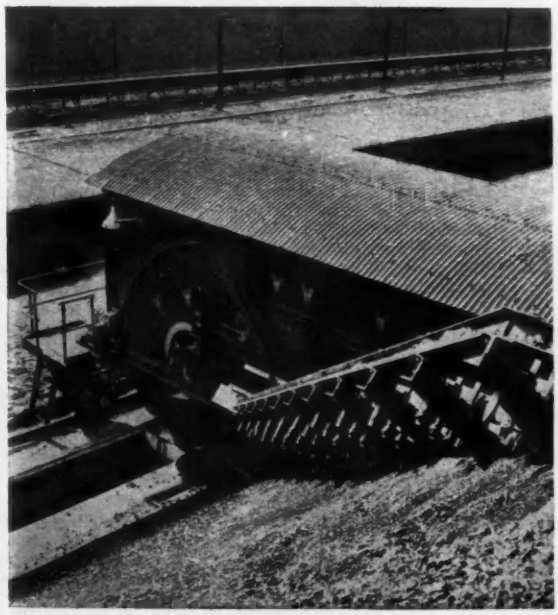


Fig. 5.—The harrow of the reclaimer with the plough conveyor depositing blended coal in the conveyor trough lower left.

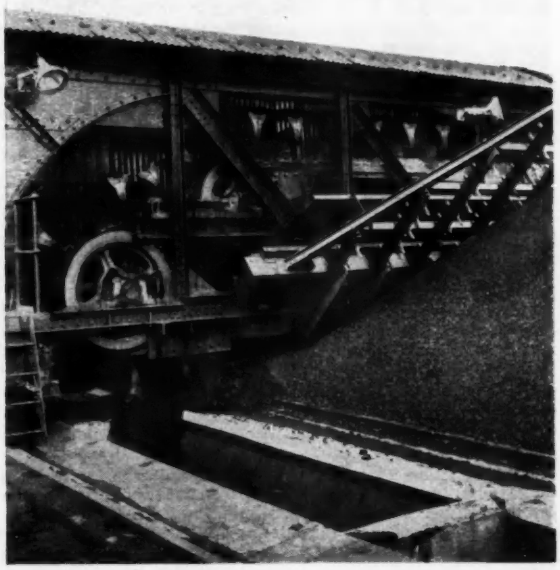


Fig. 6.—Close-up of the plough conveyor showing blended coal entering the longitudinal conveyor trough.

The machine has a two speed, double winding, continuously rated 40-27 H.P. electric motor running at 720-480 R.P.M. giving a travelling speed of up to 75 ft. per minute. Transmission is through a worm reduction gear with hydraulic coupling and solenoid brake; spur reduction gears and cast steel crown gears form the final drive to the axles. The electric supply for the motors is from overhead collector wires, using three-phase, A.C., 415 volts, 50 cycles current. The boom conveyor is driven by a 10 H.P. squirrel cage electric motor at 720 R.P.M. through worm reduction gears and flexible coupling. All

Fig. 7.—Interior of the reclaimer with plough conveyor drive motor right centre.

shafts, pulleys and belting are protected by steel mesh guards. A general view of the machine in operation is shown in Fig. 2. This illustration shows a completed coal pile at the left hand side of the picture, the spare reclaimer at the far end, and another pile being made by the tripper in the foreground.

The reclaiming machines are designed to operate against the face of the coal pile, which has a triangular cross section with a base 56 ft. wide and a height of 21 ft. 6 in. to the apex. Normally one machine is in use, with the other as a spare. A general view is given in Fig. 3 with the reclaimer —upper centre—advancing into the coal pile. The machine is built in the form of a travelling bridge spanning the width of the coal pile and has a wheel track of 75 ft. Its operational speed is from 0.1 to 0.8 ft. per min. in a forward (reclaiming) direction, with a rapid backward travel of 30 ft. per min.

Mounted on the main bridge structure is the harrow (shown in detail in Fig. 5) which agitates the face of the pile by means of a large number of points and makes a complete uniform cross-section cut at 18 strokes per min. with a 24 in. travel. This harrow is driven by a 15 H.P. slipring motor at 720 R.P.M. fitted with an hydraulic coupling, driving through a worm reduction gear.

Plough Conveyor

The agitated coal on reaching the base of the pile is collected by a plough conveyor running the length of the bridge and delivering coal to the reclaiming conveyor below ground level. This plough conveyor is reversible. Fig. 6 shows in detail the operation of the plough conveyor discharging coal to the reclaiming conveyor. The drive for each direction of the plough conveyor is provided by a 80 H.P. slipring motor at 720 R.P.M., the drive being transmitted through worm reduction gears and finally spur reduction gears to the drive shaft. The plough conveyor is operated by two chains, both carried in guides, and the ploughs run upon a bottom plate which, in combination with vertical side plates, forms a trough in which the coal is carried to the reclaiming conveyor.

The transverse drive equipment for the reclaimer is provided by a 7½ H.P. slipring motor through a roller chain drive, a double reduction gear, and a variable speed gear for forward (reclaiming) motion. For high speed backward travel, the machine is driven by a 15 H.P. slipring motor through a roller chain drive. A view of the interior of the reclaimer, with the plough conveyor drive motor in the foreground, is shown in Fig. 7.

A transfer car is provided for transferring the reclaiming machine to different beds. It is built in the form of an open frame of lattice girders, braced by cross ties and fitted with a rail track of similar span to the reclaimer gauge. The car is carried on eight cast steel wheels with double flanges, and is driven by a 15 H.P. slipring motor through worm reduction gears and a single spur gear to a cross shaft at one end. A control cubicle is mounted on the machine for controlling the speed of the drive. An illustration of the transfer car is shown in Fig. 8 with a view of the spare reclaimer in the background.

Driving motors and electric control equipment were supplied by the General Electric Co., Ltd.

Accurately Layered Pile

Coal from the railhead is fed by two Shewen electro-magnetic vibrating feeders 40 in. by 7 ft. (shown in Fig. 4) to a transverse conveyor which in turn discharges to the wing tripper conveyors. This coal for blending is then conveyed to the wing tripper which on its outward journey travels at 50 ft. per min. and on the return journey at 75 ft. per min. to discharge to the reversible boom conveyor which in turn makes up the pile with layer upon layer of coal. At the full load of 300 tons per hour, there are nearly 200 layers in the pile. By these means an accurately layered pile of varying grades of coal is built up as the wing tripper traverses the full length of the pile, these layers becoming progressively thinner as the surface area of the pile increases.

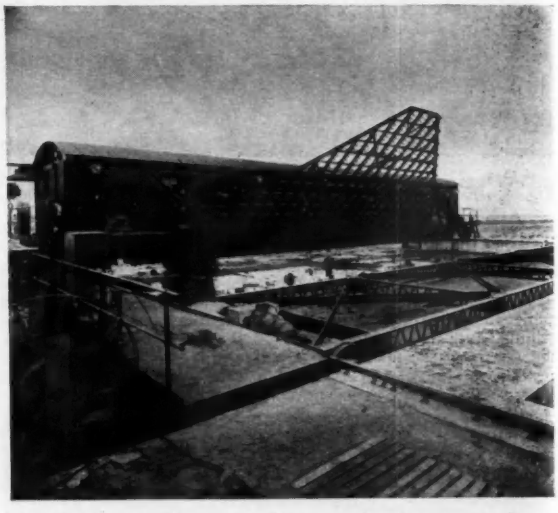


Fig. 8.—The transfer car in foreground with spare reclaimer behind.

The final process of blending the layered coal is carried out by the reclaimer advancing slowly into the pile with the harrow moving to and fro across the face of the coal at an angle greater than that of repose so that the agitation dislodges the coal which tumbles down the slope of the pile to the bottom and is then collected by the plough conveyor and fed into the reclaiming conveyor troughs, at the bottom of which runs the conveyor.

Coal is fed by conveyor to the top of the mill housing where it is then discharged to three interconnected Fraser & Chalmers Pennsylvania hammer mills. It is there crushed to 90% minus ¼ in. and from these hammer mills the crushed coal is fed to the main conveyor, rising to the service bunker.

ACCORDING to the annual report of the Revere Copper and Brass Company, it is estimated that mine production of copper in the United States and in the five other leading producing areas of the western world—Canada, Chile, Australia, the Belgian Congo and Rhodesia—will show an increase of 165,000 tons during 1953, with a potential increase of 530,000 tons by 1956. 'The major increase in mine production should begin in 1954 and reach a peak by 1955 or 1956,' the company added.

Coals for Carbonisation and Gasification in Scotland

By E. A. C. CHAMBERLAIN, Ph.D., D.I.C., B.Sc., A.R.C.S., F.R.I.C., F.Inst.F.,
Divisional Chief Scientist, Scottish Division, National Coal Board.

Paper to the Scottish Junior Gas Association (Eastern District)

ONE of the major problems to be faced by the coal industry in the future is the supplying of coking coal for metallurgical coke and, to a lesser extent, to the gas industry. Under the Act of Parliament nationalising the coal industry, the N.C.B. is clearly charged with the task of 'making supplies of coal available, of such quantities and at such prices, as may seem to them best calculated to further the public interest in all respects, including the avoidance of any undue or unreasonable preference or advantage.' But it is still not generally recognised that it is not possible to produce what is not there and especially is it not possible to produce again what has already been used. This may be self evident, but we so often hear the complaint that such and such a coal is not as good as it was, as though the fault was man made, but we are not dealing with a man made product. The coal that was mined yesterday is not the coal that is mined today, and tomorrow it will be something different again. It is only by forward planning and careful selection of priorities in working various seams that the N.C.B. can hope to meet the reasonable demands of consumers—and this task becomes ever increasingly difficult.

It is discouraging that the recent report of the Ridley Committee shows that there is no real consciousness of the existence of this problem, or of its magnitude. While there is a general awareness that coals of certain qualities are becoming difficult and more expensive to obtain, I fear that this is attributed to the ineptitude of the mining industry and that one day, provided a sensible political policy is imposed, all will again be well and that the coals of the 'good old days' will again be available in abundance. That this view exists is indicated by some of the aspects of the fuel efficiency campaign which, though vitally important—indeed, our very existence depends on the efficient use of coal—tends to give the impression that this is a passing phase and there is no need to consider fundamental changes in our ways of using coal.

Revolutionary Changes

I would say categorically that while we may be able by expedient to scrape along with our present methods for another decade, we must face the fact that revolutionary changes in all our uses of coal must take place if we are to survive as a first class nation. We are here concerned with gas industry, and it is my personal view that fundamental changes in the production of town gas are inevitable and that these changes are due now and that the plans to install traditional types of carbonising plant with an economic life of 20 or 30 years should be given second thoughts, since the types of coal required for such plants will not exist in 20 years time in the quantity required to meet an expanding industry.

Any attempt to plan or predict the future of the various types of coal for gas and coke making calls for consideration of the following factors:—

(i) An assessment of reserves of the various types of coal.
(ii) The present trend of utilisation of the various types of coal by the gas and coke industries.
(iii) What the future requirements of the country are likely to be in gas coke and smokeless fuel.
(iv) The possible readjustment of the carbonisation industries to meet the types of coal available.

Let us first of all consider the question of reserves of coal in Scotland.

Coal has been worked in Scotland for a very long time, but in large quantities (up to 30 mill. tons per annum) only during the last 150 years; during these years thousands of millions of tons have been dug from below the ground and used in one way or another to further our industrial life and our comfort. There are still reserves of coal estimated to last at least another two hundred years, but the pattern of what is left to mine has been to a large extent determined by what has been mined in the past.

The pattern of coal mining in the past has followed the lines dictated by practical economics as in the working of any other wasting asset. The tendency has always been to produce the best coal at the cheapest competitive price to the consumer. The four main factors controlling coal mining were:—

(i) Cost of production at the colliery.
(ii) Cost, transport from colliery, to consumer.
(iii) Quality, and hence the price commanded by the coal.
(iv) Geological conditions.

These factors have been inter-dependent—for example, a good quality coal has possibly been mined further from the consumer than a poorer coal with the same cost of production, and so on.

We may consider these four factors in more detail as they are significant to an appreciation of the present position.

Cost of Production

There are many reasons for variation in costs of production, but it will suffice in this general survey to reduce them to three:

(i) Depth of seam below the surface: It will be obvious for the deeper the coal the larger the shafts and mines must be to reach it and the greater the power which thereafter must be expected in raising it to the surface.

(ii) Thickness of seam: A thin seam requires the same shaft, the same roadways and surface settings as a thick seam, yet the workings must cover a very much greater area to obtain the same quantity of coal and hence proportionately the costs are greater. It will be obvious too that the difficulty of mining will be increased in many ways by cramped working conditions.

(iii) Seam quality: Unfortunately when seams of coal were laid down they were not always only 'pure coal'; it is common to find in many seams bands of dirt which run through the coal. A typical seam section of this type has a sandstone roof, 6 in. of coal, 3 in. of clay, 2 ft. of coal, 6 in. of shale, 3 in. of coal, and a fireclay floor. This associated dirt costs just as much to mine and raise to the surface as does coal, but not only is it useless when it reaches the surface, it actually costs money to remove it in elaborate and costly coal cleaning plant. It is worth noting that a certain amount of free dirt arises from room and pavement, and this will be proportionately greater in a thin seam than a thick seam. This is another reason why thick seams are cheaper to mine than thin ones.

Cost of Transport

The cost of transport is largely a matter of arithmetic assisted by map and ruler. The major coal consuming districts in Scotland have been and will continue to be Glasgow and Lanarkshire, and the economic transport of coal to these centres has greatly influenced mining development.

The criterion of quality as far as Scottish coals are concerned is ash (or rather mineral matter) content, since sulphur content is fortunately low compared with the rest of Great Britain; more than 80% of our output contains less than 1% sulphur and 93% less than 1.5%.

Very important to us in Scotland are the effects of geological upheavals. While we may appreciate the scenic beauty that has resulted on the surface, the effect on many of our coal seams has been disastrous, and it is true to say that no other coalfield in Great Britain provides such difficulties as those with which we are constantly faced. Innumerable faults limit the life of working sections, and lava intrusions have materially changed the quality of coals over wide areas while tilting, in places, has caused seams to run vertically instead of horizontally and nowhere have we the thick unfaulted horizontal seams which enable the full advantages of mechanisation to be achieved.

These four factors have influenced the pattern of coal production in the past so that in modern times the Lanarkshire coals were the first to be widely exploited. As reserves of these high quality coals dwindled mining moved in Lanarkshire to deeper, thinner seams and further afield into Fife, Lothians, and Ayrshire. This process of deeper, thinner, and further away has become increasingly apparent since the beginning of the century and the decline of the Clyde Valley coalfield has played a very important part in the economics of coal production and its availability since 1930. Already in Scotland over 10% of our output is drawn from seams under 24 in. thick and in the central field, close to Glasgow, where most of the reserves of coking coal lie, over 60% is mined from seams less than 24 in. thick.

Present Position

As a sequel to the mining history of the past, the present position may be summarised as follows:—

(i) Near the consuming centres the shallow thick seams have been exhausted and the remaining workings are now proceeding in thin deep seams. This is particularly true of the Kilsyth and Clyde Valley districts.

(ii) On the outskirts of the central coalfield, the process has not gone so far and there are still substantial reserves to work from present collieries although the seams are thin and quite deep.

(iii) Further afield in Fife, the Lothians, and Ayrshire, there are excellent reserves, and the new major developments, Rothes, Bilston Glen, Killoch, all lie in these districts. From the East Fife coalfield, for instance, production will be trebled within the next 20 years.

Reserves and Types of Coal

So far we have talked simply of coal, and no mention has been made of coal types. It is primarily coal type with which you as gas engineers are concerned, for it is the type of coal that will be available that must decide future carbonisation practice and the whole trend of gas manufacture. I have tried to obtain a general picture of reserves of coking coal as a detailed estimate has proved impossible. This may sound strange, but the problem of reserves is a very complex one, and we simply have not the information to make a sound forecast possible. Deep boring is expensive, probably not less than £30,000 per bore at the present time, and the information obtained, though important, does not show such things as step faults, which can so easily upset all calculations of possible outputs. Anyone who has had occasion to study estimates of coal reserves in this country or elsewhere must have been struck by the widely different opinions held by different authorities. This does not mean that different authorities are badly informed, or unintelligent; it is simply that opinions differ widely in what is 'workable' coal. For example, unless there are completely revolutionary developments in mining practice a seam of coal 6 in. thick would not be considered workable now or at any future date, but when it comes to seams of, say, 18 in. thick local conditions, such as the depth of the seam, strata conditions, known faulting, level working, and many other factors, combine to make a decision arguable, and while it might be a possible project at one place, a few miles away a combination of conditions may exist to make mining quite impracticable. There is thus a wide margin for expert disagreement. In Scotland particularly this must be borne in mind as many millions of tons of coal lying below the ground are in this borderline group.

To take one example, we may consider the Kilsyth coking coal seam, one of the most fruitful seams of high quality coking coals in Scotland. This seam has been very extensively mined in the Kilsyth district where its thickness lies between 24 in. in the South and 48 in. in the North. Eastwards of Kilsyth the seam splits into two leaves effectively reducing its working thickness, represented by the top leaf, to 18 in.; westwards of Kilsyth it thins slowly to 18 in. and, nearer Glasgow, to 14 in. or less. Where the seam is between 24 and 48 in. we have a bare 15 to 20 years working left and, as we already know the difficulty of mining when the seam is 24 in. thick, we might well be justified in supposing that this represented our total reserves of workable coal. But clearly there is a future for this seam if it can be worked economically at about 18 in. thick, and new mining methods might make this possible. At present we should be inclined to say no. The figures at present available indicate the workable reserves of coking coals (F.R.B. ranks 500 and 600) in Scotland to be 225 mill. tons, and assuming a future annual consumption of coking coals of between 4 to 5 mill. tons, this reserve will last for only 50-60 years. It must be recorded, however, that with an assumed consumption of, say, 4.5 mill. tons per annum, the estimated production by 1960 is nearly 1 mill. tons per annum less, so that a gap exists that must be filled by:—

(a) Importing coking coal from England, and in the North of England reserves are also becoming depleted.

(b) The development of blending with lower rank coals whenever possible.

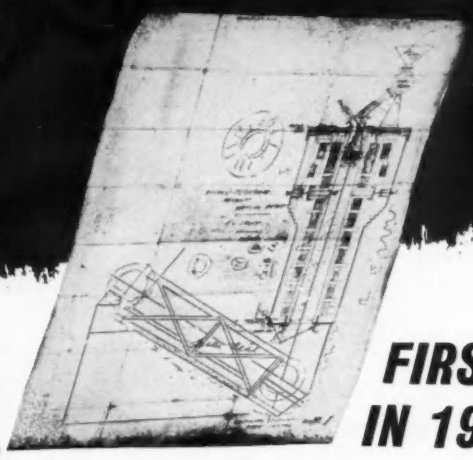
(c) The production of town gas from non-coking coals.

(d) The introduction of revolutionary methods of inducing coking properties in non-coking coals.

Clear Indication

This position appears serious and must be regarded by the gas industry as clear indication of an immediate development policy, since it is clear from the Ridley report that estimated town gas requirements generally in Great Britain are known to be too low. In Scotland, where we hope a large development of light industry will take place in the Central Valley, the result must be the development of a larger industrial load than was anticipated.

The picture, however, may not be so bad as it at first appears. The Fuel Research Rapid Survey Paper published in 1946, from which the information was obtained, can now be presumed out of date, in any case the information on which it was based was at best meagre. More recent surveys by the N.C.B. have shown that there are reserves of good quality coking coals in the Alloa area, around Airth, but at depths considered at present to be at the economic working limit. There is also the possibility that coking coal seams south of the Comedie Fault at Queenslie, near Glasgow, formerly thought to be too thin to work, will prove by boring to be of workable thickness. While we may expect production from the New Kinneil pit within four years, the Queenslie project is as yet only at the paper stage, so must be regarded as long term. Neither project, however, can have other than marginal effect on the future development programme of the gas industry, for it is not unfair to state that first call on coking coal must be the production of metallurgical coke. It is self evident that the very existence of this country depends on its ability to produce large quantities of high quality steel, while the iron foundry industry of the Falkirk area is of almost equal importance to Scotland. It is essential, therefore, that the coke ovens must have first claim to coking coal and, as far as is possible, to the weakly coking coals (type F.R.B. 700)



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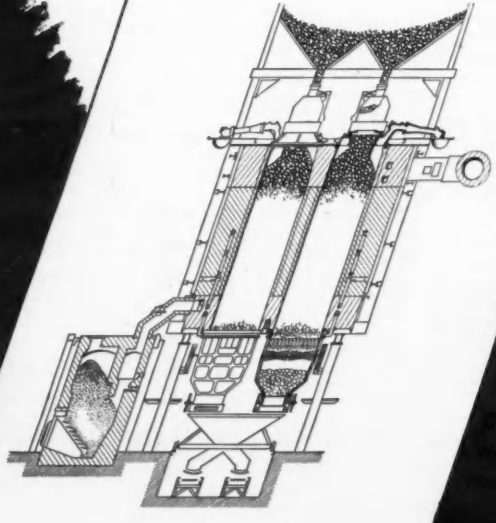

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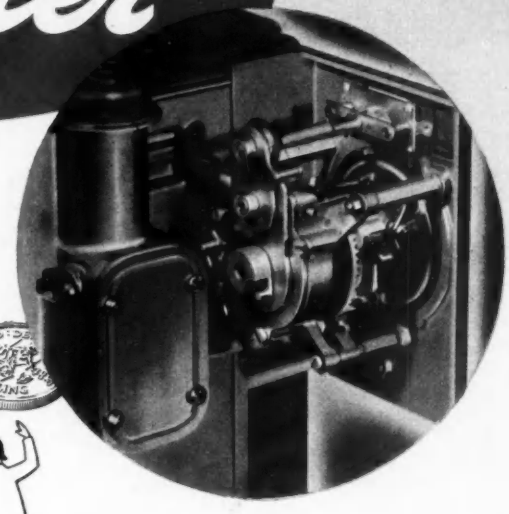

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which can be used for blending. What, then, can be done to assist the gas industry which, with its own programme of expansion, if present techniques of gas-making are used, must make heavy demands on coking-coal output? The answer has been given by Dr. J. G. King, Director of the Gas Research Board in a paper to the Institute of Fuel[1] in which he states:—

'Weakly-caking coals (*i.e.*, coals of rank 700 and 800) could be carbonised in continuous vertical retorts in greater quantities than at present, provided they were available in sized form (doubles and trebles) of relatively low ash content. The substitution of normal gas coals would be economically sound only in districts in which the cost of transport of coal was low, or if the cost of the coal could be made favourable, since the substitution would be associated with a degree of gaseous thermal yield of from 5 to 8 therms per ton of coal as charged, and a decrease of gas calorific value of 20 to 40 B.Th.U. per cu. ft.'

Referring to Scottish practice, where for many years low rank coals have been carbonised in vertical retorts, he states:—

'The decreased yield of gas per ton of coal is offset by obtaining a higher throughput of coal,' and that 'the loss of yield of saleable coke is offset by increased combustibility, a factor which has been demonstrated to financial advantage in Edinburgh.'

Production of Coke from Non-Coking Coals

Much of the fundamental research on the nature of the coking factor in coal has been done in the hope that, could the mechanism of coking be explained, it might be possible to transform non-coking coals into strongly coking coals. It is generally agreed, mainly as a result of work by H. L. Riley[2] and his co-workers, that the coal structure consists of large planar molecules built of carbon atoms with hydrogen atoms attached round the perimeter. These 'flat' molecules lie in an orderly fashion in the horizontal plant, but the various layers have a random orientation, being held apart by loose bonds associated with oxygen atoms. A visual picture of the structure is suggested by the throw-in of cards at the end of a poker hand, or perhaps even better, the snap pack during an intensive session with jammy fingers. While tentative suggestions have been made in Great Britain for inducing coking properties in non-coking coals, there has been no large scale attempt to do so. In Germany, however, Dr. R. Meldau claims that not only can he make coke from non-coking coal, but he can make coke of any required density or electrical conductivity. This is done by re-arranging the interplanar bonds by supersonic radiation. The process is said to be economically satisfactory, and a plan to prdouce 70,000 tons of coke per annum from low rank non-coking coals was commenced by Krupps in Leipzig during the last war. Why more solid evidence of this apparently revolutionary achievement has not been produced remains to be explained. Electron microscope photographs of the internal structure of coking and non-coking coals, and of non-coking coals after irradiation, show that graphite crystal growth has been induced in the non-coking coal and that its internal structure closely resembles that of coking coal.

Various other processes for producing metallurgical coke from weakly coking coals are in commercial use in Germany and in France. The Germans make use of partial hydrogenation followed by blending and coking in the normal way, and in the French process at Morienau the coal through ¼ in. is first partially carbonised at 300°C. in a vertical oven with retractable metal walls. This low temperature carbonisation product is blended with 50% of the original coal and 80% of the 50/50 mixture is blended with a strongly-coking coal and the stamped charge introduced into a normal coke oven where it is carbonised at a high temperature of 1,250°-1,300°C. This process, obviously expensive, is applicable only to coals with a swelling index of 4 upwards, so that it is not suitable for the coals of low rank (700-800) which form the major output from the Scottish Division.

Blending

It is probable that considerably increased output of furnace coke could be obtained by blending, by pitch addition, and by greater attention to grist size. These factors have been recognised in the new coke oven installation at Colvilles (Rutherglen, Glasgow), where an elaborate blending plant with 18 bunkers, each of 750 tons capacity, has recently been constructed. It is clear that blending for coke ovens has already become a necessity, and only by blending will it be possible to maintain a good quality product in the future.

The possibilities of blending for gasworks practice have not yet been properly explored in Scotland. While strongly coking coals imported from Durham are carbonised at gasworks in Scotland, they are usually treated separately, and we do not know of a true blending plant in use at a Scottish gasworks, although some mixing is attempted. This problem of blending should be tackled seriously. The Germans have recently made notable advances in the blending of weakly coking coals to produce strong cokes, based on petrographical analysis, and the control of the durain content, and more especially by substituting impact breakers instead of crushers so that the vitrain and clarain are more widely distributed among the less friable durain. Blending would also enable pitch additions to be made and other possibilities, for artificially improving the coking properties, such as the admixture of heavy oils, becomes possible. There is a wide field for research here and it would appear that blending is the immediate approach to the problem which is likely to give the necessary breathing space for the development of the more fundamental change in gas manufacture that must ultimately be introduced.

Complete Gasification

Complete gasification is still frequently regarded as a new development, as yet unproved, or as one of those things which the Germans can make to work because they do not have to worry about economics. In fact, complete gasification is neither novel nor German in origin, and even in its most advanced German form must be proved economically sound before being adopted on a commercial scale. Gas engineers have been using complete gasification in C.W.G. plants for many years, and it needs only an extension of standard producer gas practice to high pressure operation with perhaps oxygen enrichment of the air-steam blast to give us town gas direct from coal.

Processes for the complete gasification of coal have certain theoretical advantages, for example:—

(i) Complete gasification is applicable to a wide range of coals, coking coals are not required and, in fact, coking properties must be destroyed if such coals have to be used.

(ii) In such processes the plant can be more closely integrated than the traditional carbonising plant and in theory can be more efficient thermally and presumably more economic to operate (practically this claim is yet to be substantiated).

(iii) Complete gasification avoids the problem of balancing gas and coke production.

(iv) Gas quality can be controlled and varied if required over wide limits, and if the process is combined with Fischer Tropsch synthesis high C.V. gas, liquid, or solid hydrocarbons can be produced at will.

(v) Very low quality high ash coals can be used effectively.

Dr. King states in his paper: 'Processes of complete gasification provide a better answer to the problem of utilising weakly-caking coals for gas manufacture. Indeed, absence of caking power is an advantage, though not actually a necessity in the process which can be visualised from development work now in progress.

One of the advantages of complete gasification is that the final gas would consist essentially of hydrogen, carbon monoxide, and methane, the proportions of which would be under control so that such a gas could be much less subject to those variations of combustion characteristics which now tend to upset the efficient operation of gas-burning appliances.

Dr. King shows that using conventional gasification processes such as one used in Germany, we should expect an overall efficiency (gas/total coal used) of 68% and a yield of 220 therms per ton. The present methods of carbonisation yield less than 70 therms per ton. The total consumption of coal for gas manufacture in Scotland in 1950 was 2,381,000 tons producing approximately 160 mill. therms of gas; by adopting processes of complete gasification this output could be maintained for non-coking coal consumption of 730,000 tons—a saving of 1,651,000 tons of coal. While this saving must be offset by a loss of coke production, this might not be serious since coke is not yet generally acceptable as a domestic fuel, and in Scotland at least, the majority of householders would prefer the coal, while the industrial coke load could be met from coke ovens to greater advantage since the bulk density and hardness would be better than that produced from gas retorts.

The Lurgi Process

The basic Lurgi process gasifies coal at a pressure of about 20 atm. (300 lb. per sq. in.) using steam and oxygen in place of air to avoid the dilution of the yield gas with nitrogen. At atmospheric pressure the calorific value of the gas produced is only about 350 B.Th.U., but as the working pressure increases methane is synthesised in the producer itself. The Germans consider that 20 atm. is about the economic limit for general operation and the C.V. of the gas is then about 410 B.Th.U. If enrichment above this value is required, methane made from the gas by synthesis methods or from methane drainage at coal mines is used; alternatively higher paraffins such as ethane or propane, available from the Fischer Tropsch synthesis, can be utilised. The great advantages of a closely integrated chemical industry associated with coal and town gas production are clearly evident, and it is this lack of co-ordination which immediately gives rise to difficulties in this country, for at the present time there is no bulk oxygen supply in Great Britain, and unless the manufacture of ammonia can be linked to its production the nitrogen produced must be wasted and costs are thereby increased.

Although the Lurgi process was originally designed for brown coal, recent trials have indicated that certain low rank British coals 800 and 900 react in a similar way. Gasification experiments with a 900 type coal (approx. 25% ash) from Bogside, West Fife, at the Lurgi plant (Ruhr Chemie) in Germany were recently carried out and proved to be most satisfactory. The gas yield was approximately 200 therms per ton with a calorific value of 400 B.Th.U. The Germans prefer to use the gas of this calorific value as it is produced, but in this country it would be necessary to enrich it to the standard normally supplied to town—*i.e.*, 450-475 B.Th.U. per cu.ft. Enrichment could be conveniently carried out by the addition of approximately 5% of natural methane (drained from the coalfield, for example), synthesis methane, or of propane and butane. The crude gas contains about 30% of carbon dioxide and all the volatile sulphur compounds are in the form of hydrogen sulphide; these are removed by dissolving in water under pressure and the clean gas is delivered at 20 atm. to the distribution centre. The oxygen requirement of this plant is met by Linde-Frankl air-liquification units. Although the plant operates at high pressures, 20 atm., the technique of gas production is no more difficult than the water gas or producer gas processes.

Quite apart from its possible use as a town gas, the purified gas which is completely freed from all traces of hydrogen sulphide by a refrigerated Methanol process, holds much promise as a synthesis gas for the Fischer Tropsch process. The success of this process depends largely upon the absence of sulphur compounds which, if otherwise present, would poison the catalyst.

The mechanism of the process leading to the formation of methane *in situ* has been the subject of a most interesting study. It was originally supposed, according to the Lurgi theory, that the methane appeared due almost entirely to the interaction of the gaseous carbon monoxide and carbon dioxide with hydrogen, as expressed in the equation:—

$$CO + 3H_2 = CH_4 + H_2O \text{ (vapour)} \pm 88{,}680 \text{ B.Th.U.}$$

$$CO_2 + 4H_2 = CH_4 + 2H_2O \text{ (vapour)} \pm 71{,}028 \text{ B.Th.U.}$$

This, however, was later disproved by Dent and associated workers who showed that the hydrogen which was produced in the lower part of the bed along with carbon monoxide and dioxide reacted with the carbonaceous volatile matter and semi-coke in the upper part of the bed, which was at a much lower temperature. It was found that the hydrogen was actually rapidly absorbed by the semi-coke and at the same time methane was released; this reaction was favoured by high pressures and gave best results at temperatures about 500°C.

$$\underset{\text{semi-coke}}{C\,C} - H + 2H_2 = \underset{\text{hydrogenated semi-coke.}}{C} + CH_4$$

The reaction between carbon monoxide and hydrogen (Fischer Tropsch reaction) no doubt also occurs to a limited extent.

During these experiments it was found that the coal when hydrogenated became plastic, and doubt was therefore expressed as to the workability of this process on a large scale owing to the possibility of fusion of the coal into a mass. However, experience has shown that the 900 type Bogside coal and with similar East and West Midland coals this trouble did not arise.

The Lurgi producer is, of course, not the only answer to the gasification of weakly-coking coals and many other processes are in course of development, but full credit must be given to the Lurgi process as being the most successful which has hitherto been established on an industrial scale. The plant is compact and the capital costs appear to be reasonable.

Future of Complete Gasification Processes

The Lurgi type of process holds special places as a means of supplying good quality gas of 400 B.Th.U. per cu.ft. or more on a large scale, so as to meet the ever-increasing demand for gas in industry and in homes (this demand is estimated to be increasing at compound rate of about 3% per annum). A gasworks plant falls into disrepair and becomes obsolete, excellent opportunities arise for the extension of complete gasification processes, though much would depend on the outlook of the gas industry whether it wished to remain as a two-fuel industry or develop to be one producing only gas.

One outstanding feature of the Lurgi type of producer is that it utilises to best advantage and with a high degree of efficiency very poor quality low rank coals of which there is an abundance. A projected installation would require the consideration of a number of technical and economic factors and a number of questions have to be answered—for instance:

(i) What is the gas demand and distribution for the district under consideration and how is the supply to link up with other sources?

(ii) What is the most economic size of the installation, taking into account the cost of oxygen production?

(iii) What is the availability of the coal supply and whether it is most convenient to have the plant near to the pithead or to transport coal?

(iv) As much water is required, are there suitable water supplies?

(v) What is the cost and what difficulties might arise in the long-distance transmission of gas under pressure?

That problems similar to these have been faced and successfully solved is examplified by the German Ruhr Gas Organisation, which is an intricate network of trunk and feeder pipe lines supplied by the gas from various sources situated at strategic points.

(*Continued on p. 224*)

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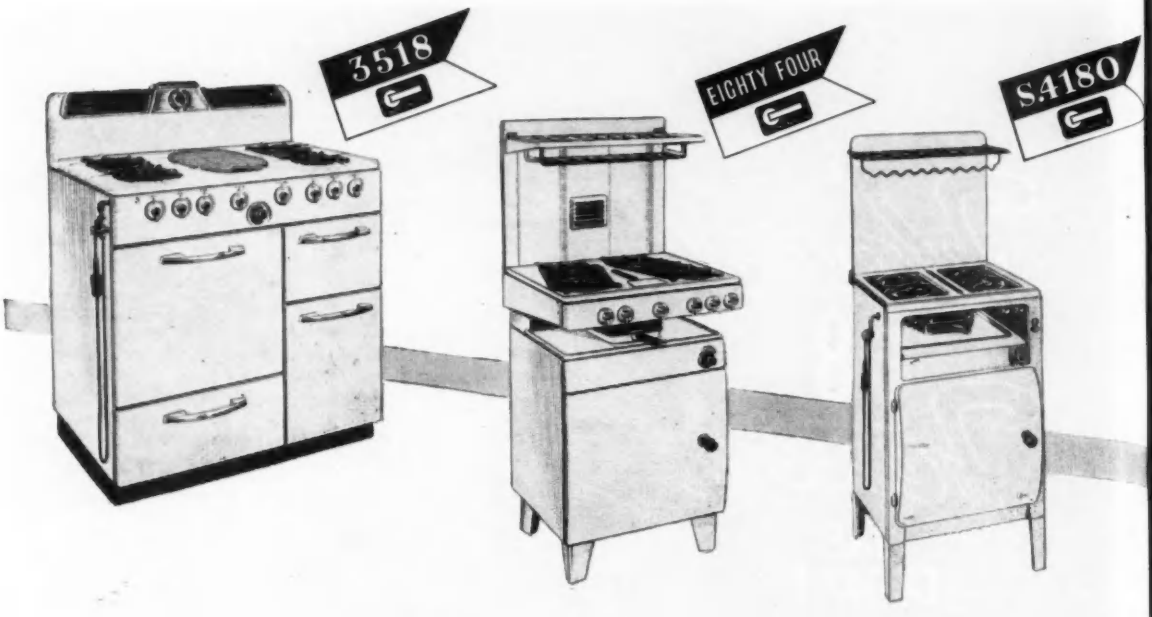

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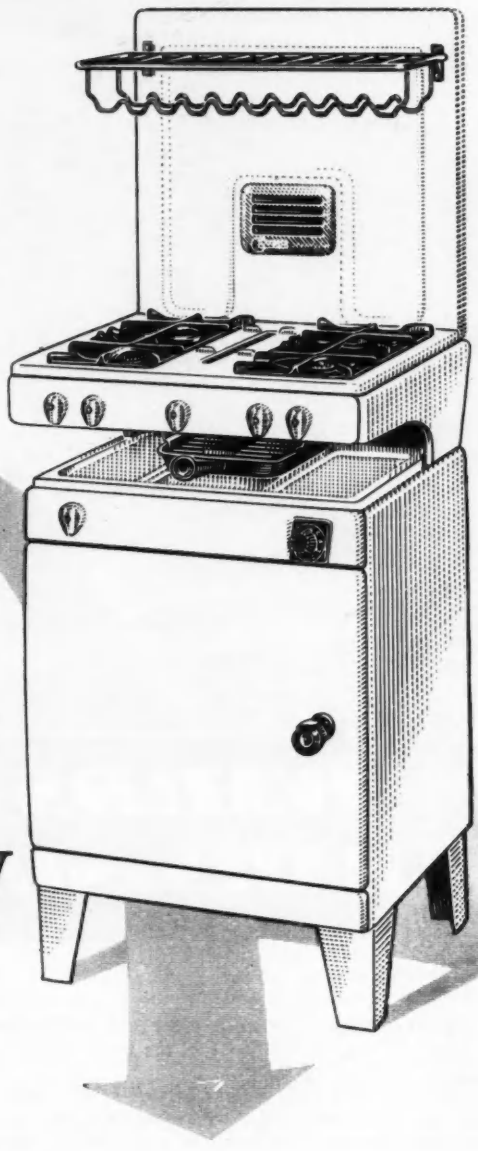

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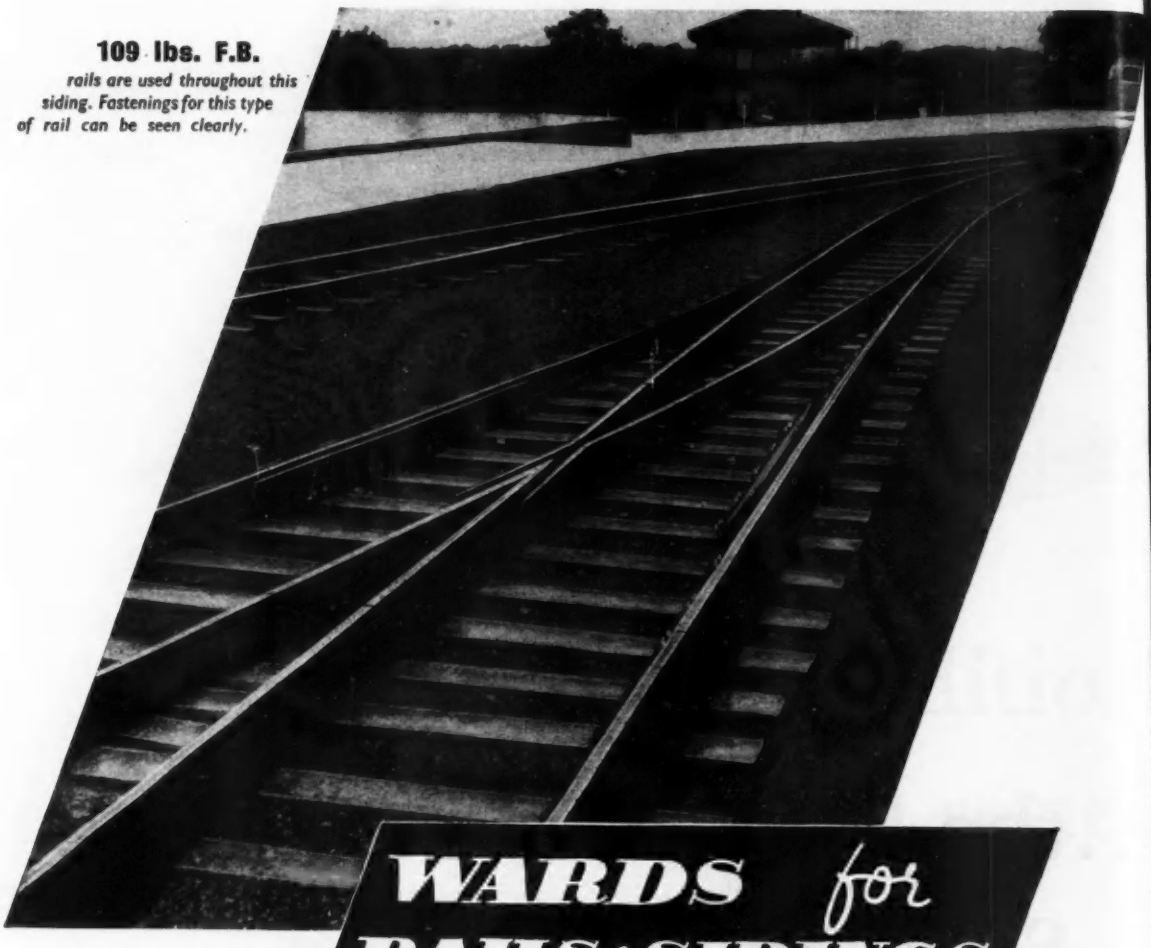

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Development of Three Wales Undertakings

By H. MAYCOCK,

Engineer, Manager, and Secretary, Holywell-Flint and Ruthin Undertakings, Wales Gas Board.

From Chairman's Address to the Wales and Monmouthshire Section of the Institution of Gas Engineers, Llandudno, April 17, 1953

MY first introduction to the former Wales and Monmouthshire Association was in January, 1934, when I took up my duties as Engineer and Manager of the Abertillery Urban District Council Gas Department. The local authority had in 1894 purchased as much of the gas undertaking of the Brynmawr and Abertillery Gas and Water Company, as was within its district. The total make of gas was 10 mill. cu.ft. per annum. The undertaking developed considerably and the works was added to in 1901 and 1908.

In 1934 the carbonising plant consisted of five settings of eight and five settings of six stop-ended retorts 22 in. by 16 in. by 10 ft. long, all hand charged. There were also two sets of carburetted water gas plant, of 200,000 cu.ft. and 150,000 cu. ft. daily capacity. The area supplied by gas included Abertillery, Cwmtillery, Bourneville, and Six Bells, together with the Great Western Railway station and engine sheds at Aberbeeg. There were 28½ miles of mains, and the population of the gas area was 23,000 with 4,700 prepayment and 300 ordinary consumers.

The carbonising plant was old and in a bad state of repair, and after tests with local coals an order for an intermittent vertical chamber oven plant of nominal output 500,000 cu.ft. per day of 430 B.Th.U. gas was placed with W. J. Jenkins & Co., Ltd., of Retford.

The installation consisted of one bench of ovens in three independent settings of three, two, and two chambers—*i.e.*, seven chambers in all. Each setting was equipped with recuperators or air preheaters and a built-in step grate producer. Auxiliary coal and coke handling, waste heat recovery, coke grading and storage plant was included in the general scheme.

The plant was designed and arranged to ensure economical working in so far as labour, fuel, and power requirements are concerned, and control instruments were provided throughout to give a ready indication and check on working conditions.

In 1945, the plant was extended by a further five chambers in two settings and comprising a separate bench from the first installation. The retort house was extended and overhead coal and coke bunkers were extended spanning over the space between the existing and new bench and over the first bench of two chambers.

The new chambers were first charged in August, 1945, and later in the year the first setting of the original bench was reset after nine years life. The following year, 1946, the second of the original settings was reset and the last oven in 1947, having a working life of 10 to 11 years respectively. The three settings had been shut down to cold patch on three occasions, when an opportunity was taken to cold patch and point where necessary and wash. With regard to the ultimate life of these intermittent chambers, my experience leads me to believe that this is determined by the life of the lower 3-5 ft. of the chamber. This portion withstands severe temperature gradients across the retort walls, and is prone to slag attack in the flues due to ash liberated when steaming the charge and by ash in the breeze pad. Pointing and washing of these lower blocks should be done fortnightly, all cracks and open joints being pointed, the chamber profile being restored where brick faces have distintegrated and the whole area washed with a creamy mixture of approved cement. Airborne sealing of these chambers can be commenced to advantage immediately new or reset chambers have been put to work and should be continued as a monthly routine.

Two of the original water sealed bottom doors were replaced by new after 16 years' work. The remaining five, after 17 years, are still at work. The only requirements of these doors are thorough cleaning after discharge, a constant water supply, and periodical greasing.

After years of experience with intermittent chambers, we were impressed with the following advantages of this type of plant: (1) Flexibility of calorific value and output; (2) lack of restriction regarding choice of coals; (3) low labour, maintenance, and power costs; (4) excellent yield of gaseous therms coupled with low fuel consumption; (5) production of a high grade coke suitable for industrial and domestic use; (6) low breeze production.

In addition to the installation of new carbonising plant in the scheme of the modernisation of the works, provision was made for the erection of a new road retaining wall, one new two-lift spiral guided holder in a steel tank with a capacity of 250,000 cu.ft., benzole recovery plant, river retaining wall and new mess room and shower baths, etc., for the works employees.

Holywell-Flint and Ruthin

The Holywell undertaking (of which the author became Engineer, Manager, and Secretary on January 2, 1946) was one of the first of the British Gas Light Company's stations. In 1824 land was purchased in the parish of Greenfield, two miles from Holywell, for the erection of a gasworks, and the company commenced to supply gas in the following year to the townships of Holywell, Greenfield and Bagillt. The present plant is on the site of the original works. A petition was received by the company in October, 1847, from the inhabitants of Flint, requesting a supply of gas for that town, but the directors could not see their way to comply with the request, and shortly afterwards a company was formed in Flint to manufacture its own gas. In July, 1931, the British Gas Light Company purchased the Flint gas undertaking, and gas was first supplied from Holywell to Flint in 1934—87 years after the original petition.

When the Flint undertaking came under the control of the British Gas Light Company consideration was given to the question of which of the two sites was the more suitable for a manufacturing station, as it was obviously uneconomical to continue to run and maintain both plants. Meanwhile, it was decided to connect the village of Bagillt with Flint, so that a supply could be sent either from Flint or Holywell as circumstances dictated, and a 6 in. steel main with welded joints was laid at the end of 1932, this forming the first part of the linking main between the two works.

The Holywell works was chosen as the manufacturing station, and in 1933 the 6 in. steel main was continued through to Holywell, and contracts were placed for the erection of two new gasholders, one at each works, and for installation at the Holywell works of a complete new carbonising plant of intermittent vertical chamber ovens and various ancillary plant.

While this work was in progress the company purchased premises at Flint, which have been rebuilt; the premises comprise showrooms and offices with a flat above, in the centre of the town.

(*Continued on p. 224*)

a good looker...

and a fine cooker

the MAIN No. 20

CENTURY

GAS COOKER

Clean design and vitreous enamelled surfaces throughout—exterior finished in cream • four dual-purpose hotplate burners—all can be used for fast-boiling or simmering • large griller with grill pan and crosswire grid • hotplate fittings can be easily removed for cleaning • hotplate-well free from projections and dirt traps • safety-type gas taps • double-shelf plate-rack • roomy oven giving high-quality cooking performance with minimum gas consumption and with easy-to-clean rounded corners • Mainstat oven heat control • flash tube lighting to oven burner • drop-type door allows maximum light to enter oven • used oven heat vented in front of backplate and warms plate-rack • storage space in plinth base • hotplate side extensions and gas lighter supplied if required.

The Century cooker combines efficient performance with ease of cleaning.

NOTE THE NAME—MADE BY MAIN

R. & A. MAIN LTD
London and Falkirk

153

The new carbonising plant consisted of a bench of Jenkins' Klönne intermittent vertical chamber ovens. The nominal total output of the plant is 260,000 cu.ft. per day with all the chambers in action when the coal carbonised would be about 16 tons. The carbonising plant was extended in 1937, an additional bed of four chambers being built, and a further bed of three chambers in 1945 making 14 chambers in all. The installation of overhead storage bunkers for coal, coke and breeze, was commenced towards the end of 1945. The total nominal output of the 14 ovens is 520,000 cu.ft. per day.

Two New Holders

In 1934, two new gasholders, each of 100,000 cu.ft. capacity and of identical design were erected by C. & W. Walker, Ltd., of Donnington, one at Holywell and one at Flint, to facilitate the distribution of gas now made entirely at Holywell. In the engine room are two exhausters, with a rated capacity of 10,000 cu.ft. and 15,000 cu.ft. per hour, respectively. In the same room there are two steam engine driven rotary compressors for pumping the gas into Flint.

The boiler installation comprises two Cornish boilers, one 15 ft. by 6 ft. by Marshall Sons & Co., Ltd., Gainsborough, and one Tinker Shenton boiler, 18 ft. by 6 ft., the evaporation of each boiler being rated at approximately 2,000 lb. per hour. Other plant comprises two Evans wall pumps for the boiler feed, one lime-soda water softening plant by Filtrators, Ltd. (output 250 gal. per hour), one Livesey washer (capacity 300,000 cu.ft. per day), one rotary washer scrubber (300,000 cu.ft. per day), four purifiers 12 ft. by 18 ft. by 5 ft. deep controlled by a Wecks valve, and one station meter (capacity 15,000 cu.ft. per hour).

Post-War Improvements

On taking up my duties in 1946 I found the plant, due to the strain of the war years, lack of suitable labour, black-out conditions, and the scarcity of new materials, had suffered in efficiency and general state of repair. I have since carried out a considerable amount of reorganisation and reconstruction of the plant, improvements and additions to the distribution systems, and re-organisation of the administrative and commercial policy with gratifying results.

Main items at the Greenfield works embrace a complete overhaul and resetting of the carbonising plant; installation of overhead coal and coke bunkers and skip hoist with fully automatic control; new liquor circulatory system; installation of larger exhausters; automatic control on both boilers; new feed water pumps, and soft water storage tank capacity (4,000 gal.) and installation of larger wet purification plant.

New work has included the design and erection of new offices, stores, fitting shops, carburetted water gas plant building, compressor house, construction of new roads, and drainage system within the works; installation of a carburetted water gas plant (capacity 200,000 cu.ft. per day); four concrete purifiers 20 ft. by 20 ft. by 5 ft. 6 in. deep; one spiral guided holder in steel tank (capacity 200,000 cu.ft.), one B.M. station meter (capacity 30,000 cu.ft. per hour); and erection of boundary wall.

Work at the Flint station has included conversion and modernisation of the works cottages; building of a new office; and reinforced concrete foundation, an all welded spiral guided holder in steel tank (capacity 200,000 cu.ft.), holder connections and cut off valve.

Trunk Mains

At the Ruthin station the work carried out has included the complete resetting of No. 2 and 3 beds of six stop-end retorts from cellar floor level; new retort house governor, and foul main to inlet of condensers; conversion of water sealed purifiers, to dry seals; producer gas plant; holder foundation, and one spiral guided holder in steel tank (capacity 100,000 cu.ft.).

New trunk mains have been laid at each undertaking, and several new housing estates has been developed in each district. The introduction of a consumer sales and service scheme has met with considerable success.

Progress made at the Holywell-Flint and Ruthin Undertakings from the year 1945 to 1951 inclusive expressed as percentage increases is as follows:—

	Holywell & Flint. %	Ruthin. %
Annual make	39.1	25.4
Annual sales	36.5	33.6
Gas consumed by public lighting	91.7	nil
Gas consumed by ordinary consumers	46.9	45.5
Gas consumed by prepayment consumers	33.1	20.3
Average consumption per ordinary consumer	30.5	1.6
Average consumption per prepayment consumer	27.7	13.3
Price per therm	27.0	29.7
Coal carbonised	13.4	16.3
Coke available for sale	15.4	9.0
Net cost of gas into holder	12.3	7.0
Average price per ton of coal	33.9	32.6
Total revenue	83.8	66.4
Number of Consumers.		
Ordinary	13.5	56.0
Prepayment	3.5	6.7

My thanks are due to the former directors of the British Gas Light Company and the Wales Gas Board for the freedom of action afforded me in bringing the Holywell-Flint, and Ruthin undertakings to their present state of efficiency, and to the staff and workmen of each of the undertakings referred to in my address, without whose co-operation and support these results would not have been possible.

COAL BOARD'S BY-PRODUCTS

PARTICULARS of the production and sales of National Coal Board by-products are given by the Board in a booklet produced for the Oil and Colour Chemists Association's Trade Technical Exhibition at the Borough Polytechnic.

The N.C.B. produces about 26% of the total quantity of crude benzole produced in this country, most of which is refined at the Board's plants to motor, nitration, and pure 90's benzole. The whole of this latter output is marketed by the National Benzole Co., Ltd., but the Board markets direct its output of toluoles, xylols, and naphthas.

The booklet gives the quality specifications for the various light oils, lists the other by-products from the ten tar distilleries operated by the Board and also the various by-products marketing offices of the Board.

Copies of the booklet are obtainable from the National Coal Board, Hobart House, Grosvenor Place, London, S.W.1.

CARBONISATION COALS IN SCOTLAND—

continued from p. 216

It would be most interesting to crystal-gaze into the future and to imagine how such a scheme would appear on the face of Scotland. We could, for instance, visualise a main trunk running from east to west across the country, following, say, the Forth-Clyde Canal from Grangemouth to Glasgow, which would interconnect with existing gas grids and be fed with supplies from a large Lurgi-type plant situated at places such as Bogside. Natural methane drainage from such places as Cardowan (suitably blended with water gas) synthetic methane, and surplus gas from petroleum refineries (*e.g.*, at Grangemouth) could be pumped into the system. But who can tell what the future will bring? Much will depend upon decisions whether it is more desirable for the country as a whole that the gas industry remains a two-fuel industry, or develop into a one-fuel industry, or perhaps adopt an intermediate policy.

REFERENCES

(1) J. G. King, *J. Inst. Fuel*, 1951, *24*, 147-164.
(2) H. L. Riley *et al.* *Nature*, 1947, *159*, 536-539.
H. L. Riley, *Chemistry and Industry*, 1948, 569-571.
H. L. Riley *et al.* *J.C.S.*, 1948, 1693-1700.

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Cast Iron Purifiers temporarily erected in our Works prior to despatch

Specialists in TANKS, Steel or Cast-Iron, Riveted or Welded, etc.
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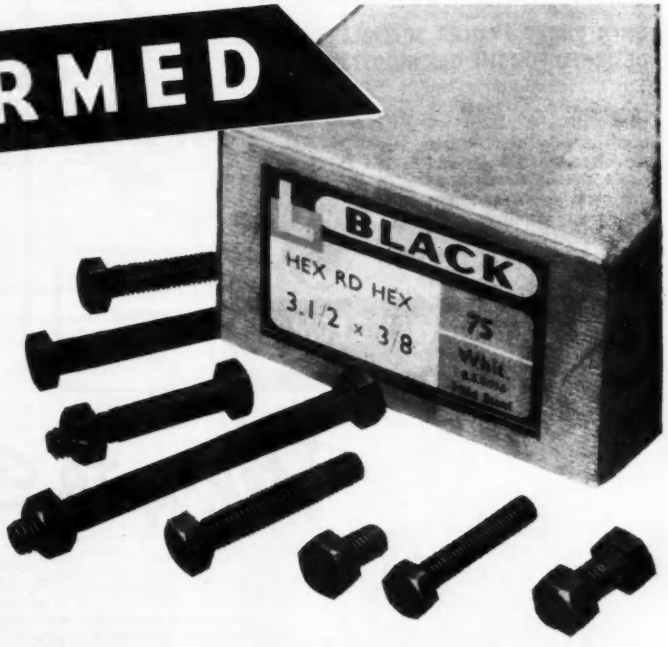
By midsummer ⅞" dia. will also be available



ADVANTAGES

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- CAN BE USED IN PLACE OF TURNED BOLTS FOR MANY APPLICATIONS AT CONSIDERABLE REDUCTION IN COST.
- MOST SMALL SIZES IN STOCK.

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BURNBANK LANARKSHIRE

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The "A & M" DRY TEST METER

For 'in situ' test of consumers is available in sizes ranging from 100 to 700 cu. ft. per hour.

Full details will be supplied on request.

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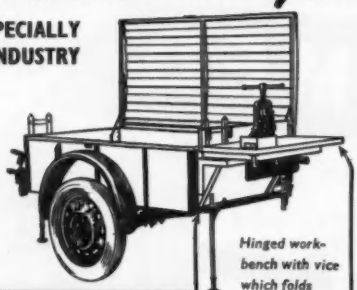
Take your workbench with you

ON A PRATT TRAILER SPECIALLY DESIGNED FOR THE GAS INDUSTRY

This latest addition to the range of PRATT trailers embodies all the recognized qualities of the other models... sound design and construction, strength at minimum weight, excellent springing, stability, good carrying capacity.

WRITE FOR DETAILS



Hinged workbench with vice which folds into body when travelling or not in use.

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NORTHALLERTON, YORKS. TELEPHONE: NORTHALLERTON 142

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FOR STEAM, WATER, OIL, GAS AND AIR

Plenty to Spare...

During the past few months, considerable re-organisation of our works has taken place: production is planned on an entirely new basis, with the result that output is increasing. This is particularly so with fittings, and deliveries can be made from stock as shown.

Your orders will be dealt with promptly and efficiently.

MAKING-UP PIECES available in the following sizes, black or galvanised, ⅛in., ¼in., ⅜in., ½in., ¾in., 1in., 1¼in., 1½in., 2in., 2½in., 3in. and 4in.

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PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates : Home and Empire :- 52/- per annum ; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements : All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements : Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER : S. T. CULLEN

MIDLANDS OFFICE : 10, Union Street, Birmingham.

NORTHERN MANAGER : W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone : Harrogate 84291.

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SPECIALLY ACTIVATED OXIDE OF IRON

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In Every Ship of the Royal Navy

"KLEENOFF" *
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KETTLE DESCALER

* *For resale to the public, and in bulk for Works use.*

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Offer Your
SCRAP GAS METERS
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PATENTS

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(Director, B. T. King, A.I.Mech.E., Patent Agent.) Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone : City 6161.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

NORTH THAMES GAS BOARD

THE following DRAWING OFFICE STAFF are required in the Chief Engineers' Department :—

(i) At BECKTON, E.6, LEA BRIDGE, E.10, MILL HILL, N.W.7, and KENSAL GREEN, W.10, DRAUGHTSMEN experienced in the maintenance of gas manufacturing and ancillary plant. Starting salary within the range £370-£600 per annum.

(ii) At WESTMINSTER, S.W.1.

(*a*) SENIOR DRAUGHTSMEN experienced in the design of gas manufacturing and ancillary plant, including steelframe structures. Starting salary within the range £645-£795 per annum.

(*b*) DRAUGHTSMEN experienced in the layout and detailing of gas manufacturing and ancillary plant, including steelframe structures. Starting salary within the range £520-£695 per annum.

(*c*) DRAUGHTSMEN for detailing reinforced concrete structures. Experience in design would be an added advantage. Starting salary within the range £520-£695 per annum.

All these appointments are of a permanent nature and successful candidates will be required to join the Staff Pension Scheme. Starting salaries within the ranges mentioned will be dependent on age and qualifications.

Applications, giving full particulars, should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, London, W.8, to reach him not later than ten days after the publication of this advertisement and quoting reference 666/63.

CHIEF DRAUGHTSMAN. This Company is expanding its London Drawing Office and requires a man with extensive experience in the design of mechanical handling plant for gas and allied industries, to take charge.

Applicants to state age, experience and salary required to :—W. J. JENKINS & Co., LTD., BEEHIVE WORKS, RETFORD, NOTTS.

WALES GAS BOARD

SWANSEA UNDERTAKING

APPLICATIONS are invited from suitably qualified persons for the following appointments:

DISTRIBUTION DEPARTMENT

(*a*) SENIOR TECHNICAL ASSISTANT

Applicant should be experienced in all branches of modern Gas Distribution practice and the supervision of Distribution personnel. The salary will be in accordance with Grade A.P.T. VII (Provincial 'A') of the National Salary Scales, at a figure commensurate with qualifications and experience.

(*b*) TECHNICAL ASSISTANT

Applicant should be experienced in the preparation of specifications, drawings and estimates peculiar to the Distribution Department of a Gas Undertaking. The salary will be in accordance with Grade A.P.T. V (Provincial 'A') of the National Salary Scales, at a figure commensurate with qualifications and experience.

The above posts are superannuable and the successful applicants may be required to pass a medical examination.

Applications, stating age, training, experience and qualifications accompanied by names of two persons to whom reference can be made, should reach the undersigned not later than fourteen days after the appearance of this advertisement.

ERNEST ABLETT,
Engineer, Manager & Secretary.

Oystermouth Road,
Swansea.
April 15, 1953.

EASTERN GAS BOARD

NORWICH DIVISION

TECHNICAL ASSISTANTS—

NORWICH GROUP

APPLICATIONS are invited for the following positions, the commencing salaries for which will be within Grade A.P.T. VI (£490-£570 per annum) of the National Salary Scales for Gas Staffs.

TECHNICAL ASSISTANT, NORWICH WORKS required to assist in the operation and technical control of the Works which has a maximum output of approximately 5 million cubic feet per day. Experience with Glover West Continuous Vertical Retorts would be an advantage.

TECHNICAL ASSISTANT, SMALL WORKS required to assist in the supervision and technical control of the smaller Works within the Norwich Group, having outputs between 12 million and 70 million cubic feet per year. Experience on small Works with stop-ended Horizontal Retorts would be an advantage.

Candidates for both positions, preferably between 25 and 30 years of age, should possess suitable qualifications and experience and, if successful, will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with the names of two referees, should reach the undersigned within fifteen days of the appearance of this advertisement.

J. V. KNIGHT,
Manager.

Norwich Group,
Eastern Gas Board,
Bishop Bridge,
Norwich.

(*Classified advertisements continued on Supplement* 4)

APPOINTMENTS VACANT (ctd.)

REQUIRED, young man aged about 25/30, as GENERAL ASSISTANT in our Tar Products Export Department. Good scope for advancement for candidate with initiative. Please write giving particulars of previous experience to TARS AND OILS LTD., 68, Wellington Court, St. John's Wood, N.W.8.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION

DRAUGHTSMAN/TECHNICAL ASSISTANT—

COVENTRY DISTRICT

APPLICATIONS are invited for the above position. The duties include assisting in the preparation, checking and recording of Distribution schemes and candidates should possess the ordinary Grade Certificate of the Institution of Gas Engineers or the Institution of Mechanical Engineers.

The salary will be within Grade IV (£305-£495 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate will be required to pass a medical examination.

Applications, stating age, qualifications and training together with the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board (Warwickshire Division), Gas Street, Coventry, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

NORTHERN GAS BOARD

DARLINGTON DIVISION

TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at the Darlington Unit of the Northern Gas Board.

Candidates should be experienced in gas Manufacture and works maintenance with Continuous Vertical Retorts, C.W.G. and ancillary plants. Preference will be given to applicants holding the Institution of Gas Engineers certificate in Gas Engineering (Manufacture), and the successful applicant will be required to undertake shift duties.

Conditions of service will be in accordance with the National Joint Council for Gas Staffs Agreement, Salary—Provincial 'A', Grade A.P.T. VI—£490 to £570 per annum, initial placing according to experience, plus an allowance for shift duties.

Applications, stating age, qualifications and experience together with the names of two referees, to be sent to Charles Hindle, Esq., Sub-Divisional Manager, Northern Gas Board, Darlington Division, Gas Offices, John Street, Darlington, not later than May 9, 1953.

F. WILSON,
Divisional General Manager.

April 15, 1953.

SCOTTISH GAS BOARD

FIFE GROUP

KIRKCALDY DISTRICT

WORKS FOREMAN

APPLICATIONS are invited for the position of WORKS FOREMAN of the above District Gas Undertaking.

Applicants, who should be under 45 years of age, should be time served mechanical engineers, and a knowledge of gasworks practice will be an advantage.

The salary will be in accordance with Provincial 'A' Grade VI of the Intermediate Grades of Salaries (Conditions I), *i.e.*, £450 per annum rising to £495. A house will be made available.

Applications, giving details of experience, and with *copies* of two recent Testimonials, should be lodged with the Undersigned on or before Saturday, May 2, 1953.

JOHN H. FULTON,
District Manager.

28, Links Street,
Kirkcaldy, Fife.
April 15, 1953.

EASTERN GAS BOARD

WATFORD DIVISION

HOME SERVICE ADVISER

APPLICATIONS are invited for the position of HOME SERVICE ADVISER in the Hitchin Group covering Hitchin, Stevenage, Letchworth, Baldock and Biggleswade.

Candidates should have had at least two years training and possess a recognised diploma. Duties will include the giving of cookery and home laundry demonstrations, lecturing and visiting consumers in their own homes to advise on the correct use of gas appliances. Previous experience in a similar capacity in the Gas Industry would be a strong advantage.

The commencing salary, dependent on age, qualifications and experience, will be within the range £336-£472 per annum. The appointment is subject to a satisfactory medical examination and the successful applicant will be required to join the Board's pension scheme.

Applications giving age and full particulars of training and experience, should be sent to the General Manager, Eastern Gas Board (Watford Division), Radiant House, Clarendon Road, Watford, Herts., by April 29.

PLANT FOR SALE

FOR SALE, ex Works in Swansea area, about 200 tons Monohydrate ($Fe.SO_4.H_2O$) per week from June, 1953 onwards—Enquiries to: No. 148, *Gas Journal*, 11 Bolt Court, Fleet Street, London, E.C.4.

FOR SALE, SKIP HOIST (Strachan & Henshaw) fully automatic, unused and not assembled. Capacity 50 tons per hour.—Jamestone Quarry, Ltd., Haslingden, Lancs. *Tel.*: Rossendale 1440.

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NATURAL BRITISH.

BOG (DUTCH and DANISH) ORE.

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See our Advertisement Next Week.

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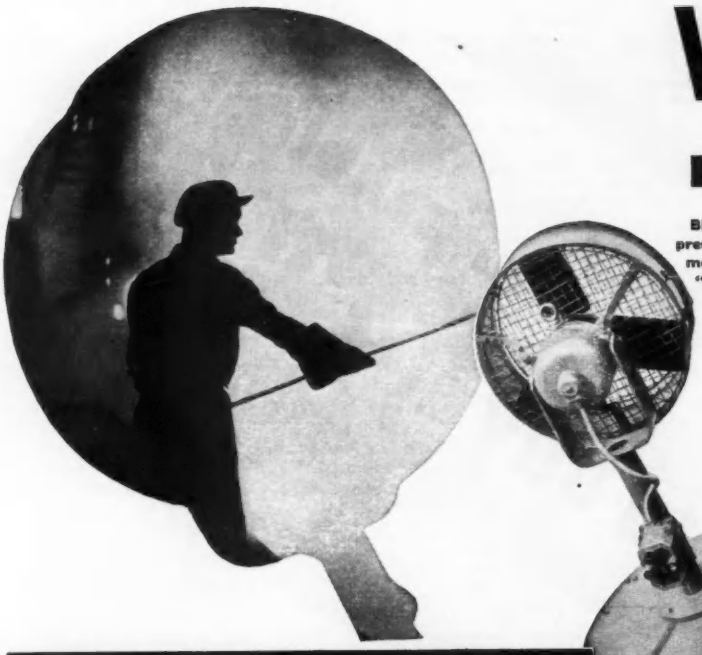

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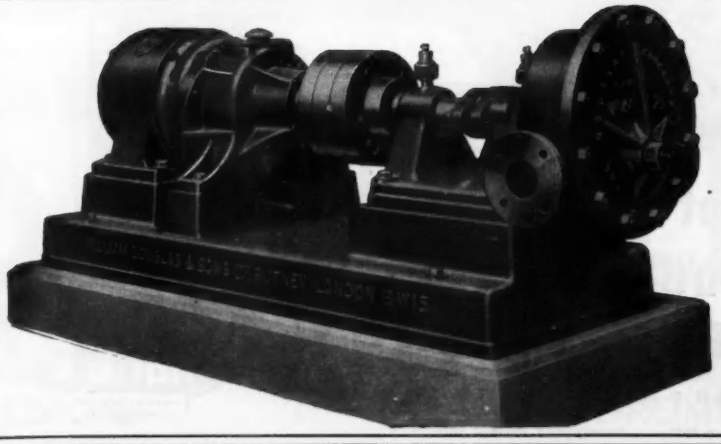

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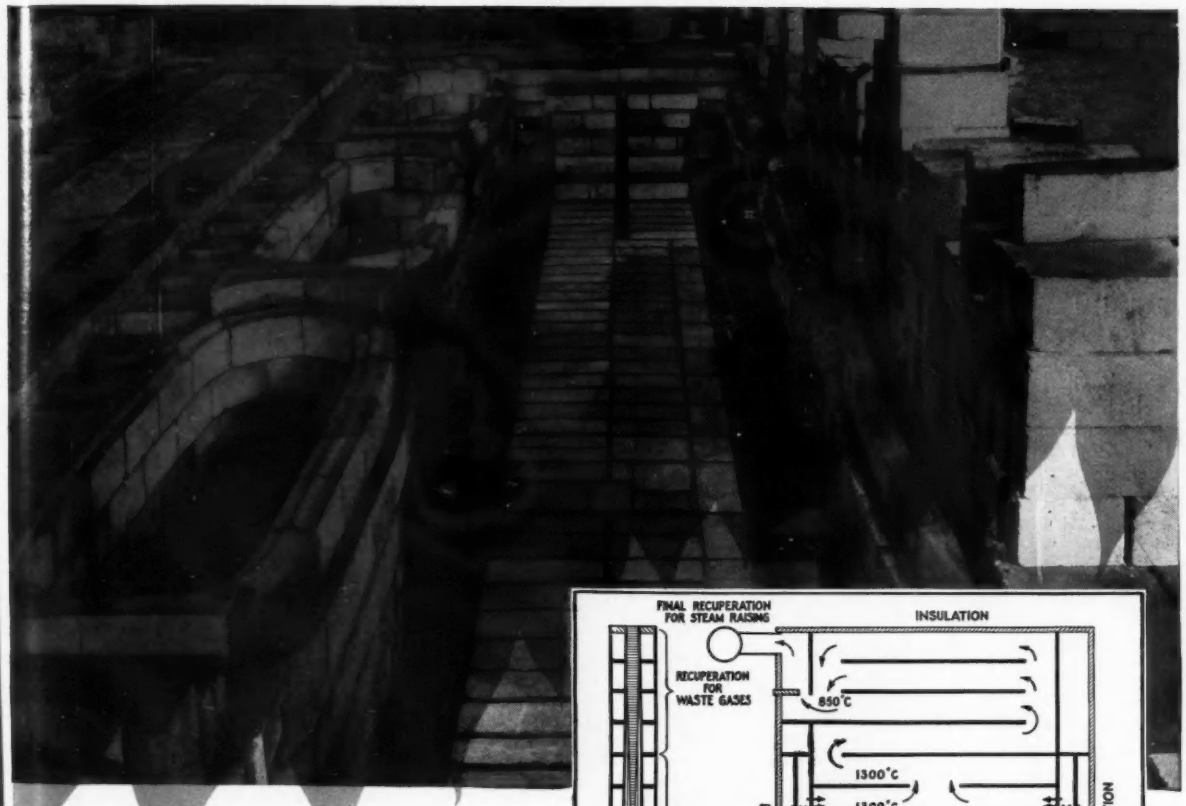

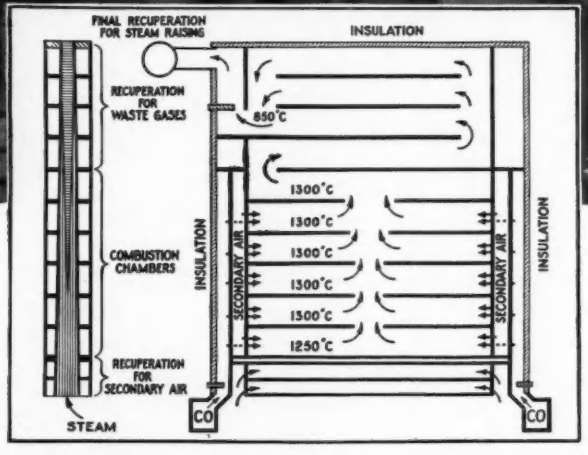

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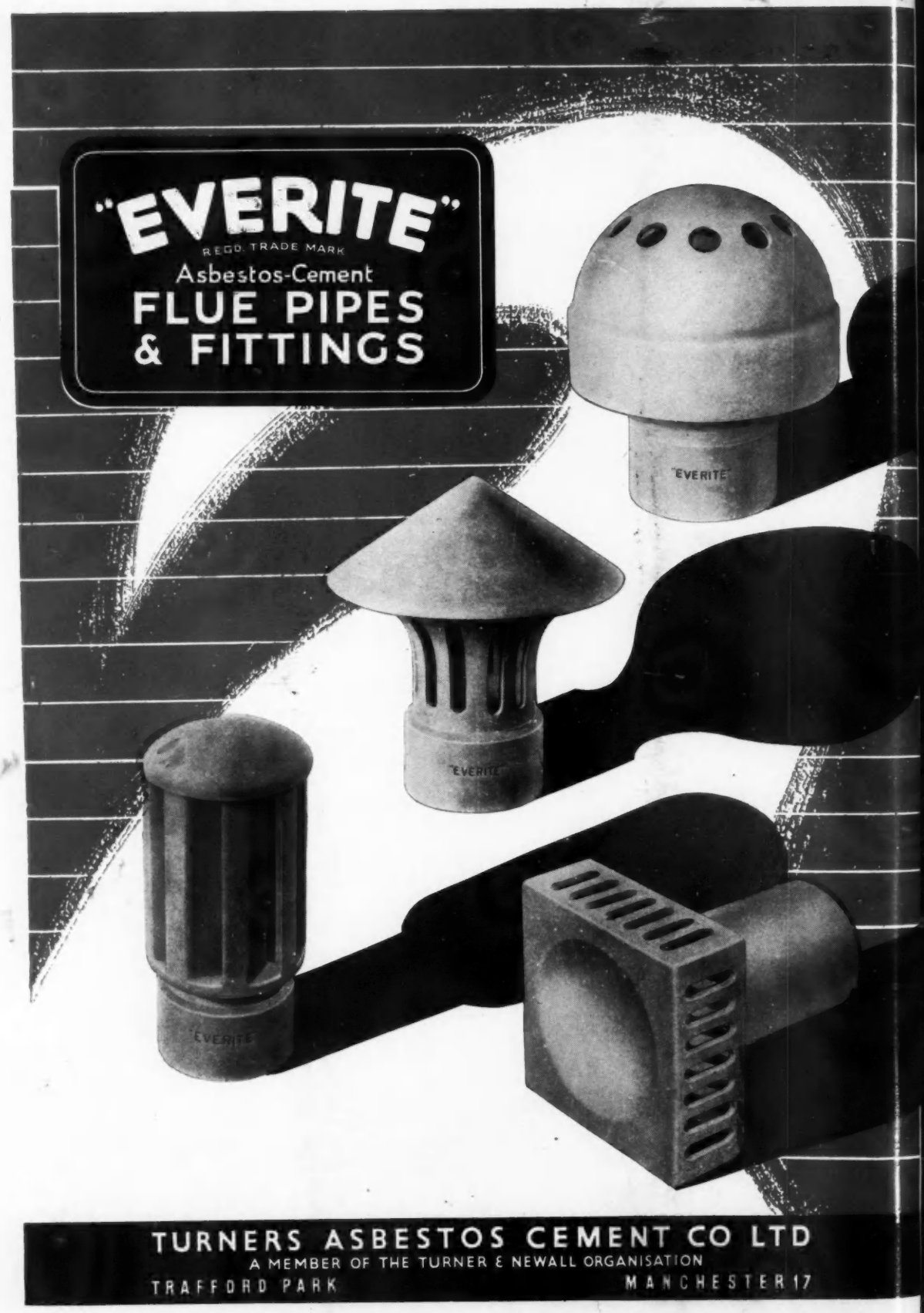

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